MAY 4, 1961

ONE SHILLING AND SIXPENCE

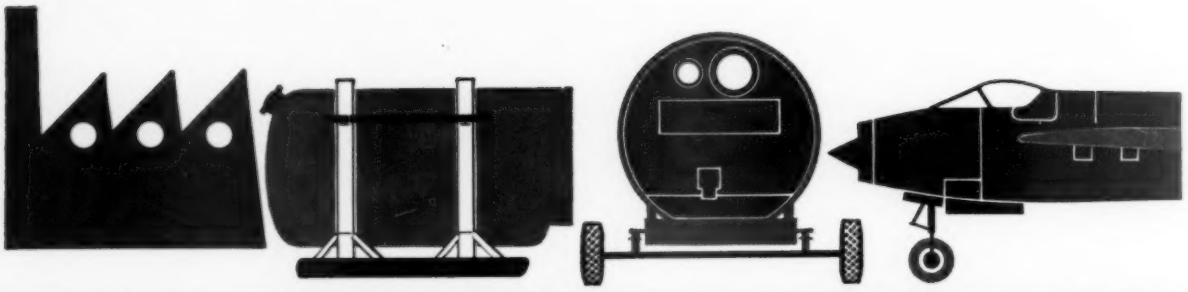
# THE AEROPLANE and ASTRONAUTICS

**EXECUTIVE and PERSONAL AIRCRAFT**

announcing

the first BEAGLE

The BEAGLE-Auster A.109 Airedale



# BRITISH OXYGEN
## COMPLETE GROUND-TO-AIR SERVICE IN LIQUID OXYGEN

British Oxygen handle liquid oxygen from production to delivery and all associated ground and airborne equipment. British Oxygen are leaders in the field of low-loss-rate vacuum insulated storage tanks, dispensers and converters.

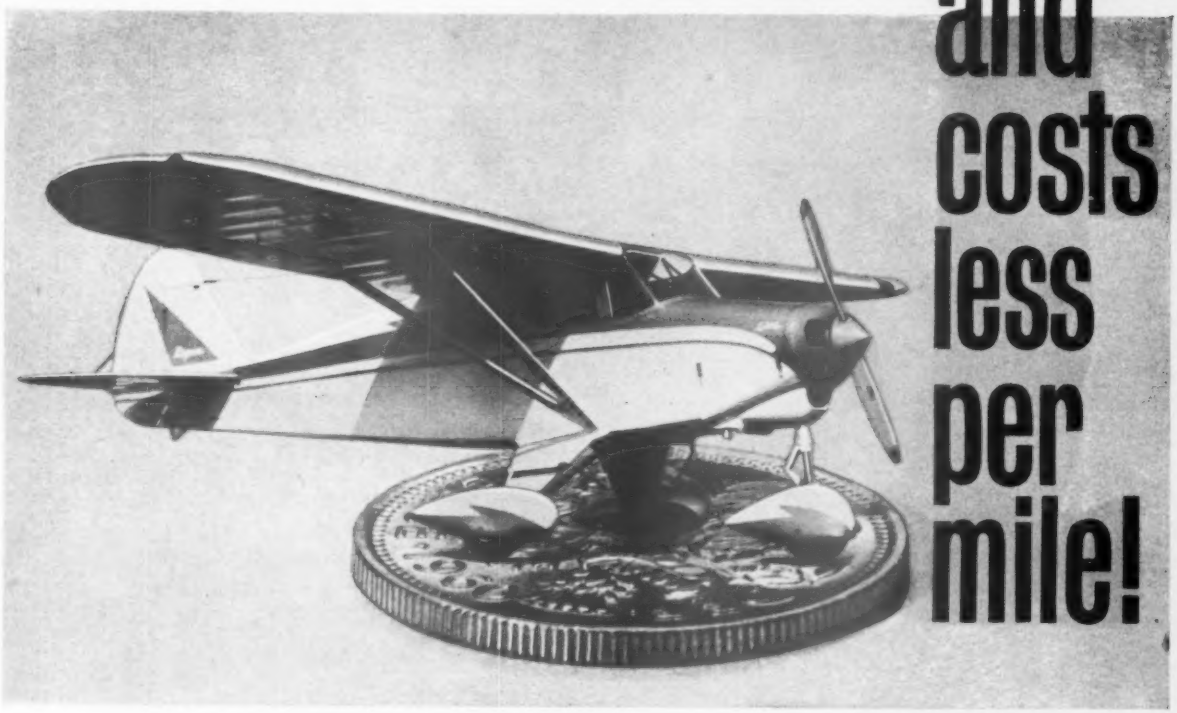
**Research and liaison keep British Oxygen alert to the problems of flight—let them help solve your problems today.**

BRITISH OXYGEN AVIATION SERVICES

BRIDGEWATER HOUSE, ST. JAMES'S, LONDON, S.W.1

Second class postage paid at New York, N.Y.

# LANDS ON A SIXPENCE... and costs less per mile!



# PIPER Colt 108

These are the facts that put flying right within your reach. The amazing new Piper Colt is designed and built to be flown without any great skill or cost. Has proven tricycle undercarriage and Hydra-sorb shock absorbers for masterfully safe landing. Powerful, smooth hydraulic brakes for sure, stable stops. Large nose wheel directly linked to rudder bar for finely controlled taxi-ing. All these simple-fly features plus legendary Lycoming 108 h.p. engine. Rugged reliability with 22 m.p.g. economy. Piper Colt carries two and luggage in comfort. Costs less than 6d. a mile to fly. And lands—'on a sixpence!' Learn more about the

**PIPER Colt**

THE IDEAL AIRCRAFT FOR FLYING CLUBS AND GROUPS

*Cash Price: £2,795 or 20% down and 36 Monthly Payments*

*from*

VIGORS AVIATION LTD., OXFORD AIRPORT, KIDLINGTON

TEL: KIDLINGTON 3444 *Sole U.K. Distributors*

MORE PEOPLE FLY PIPER THAN ANY OTHER AIRCRAFT IN THE WORLD

A

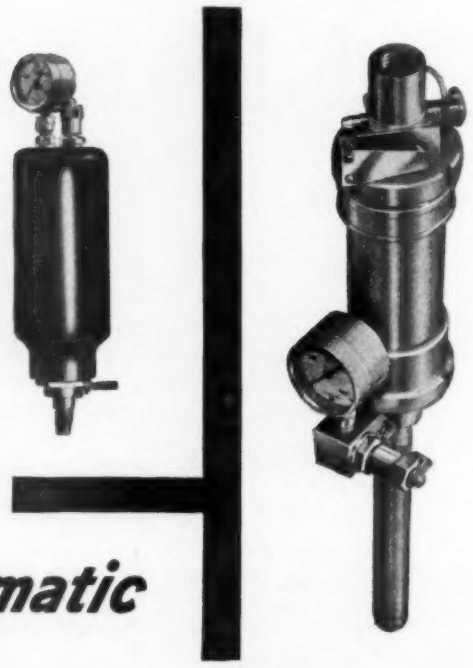
## *developments in flight equipment . . .*

**SNAP JACKS AND BOTTLES**

Jettison of canopy or drop tank, emergency release of catches or locks is achieved with these self-contained high-thrust jacks requiring no external pressure system. In both snap jacks and snap bottles, stored pressure is retained for a longer period by a metal bursting diaphragm until released either mechanically or electrically. A typical snap jack with 650 ft. lb. stored energy, 3" stroke, initial thrust of 4,000 lb. weighs 2.4 lb.

Hymatic, as leading engineers in the Aircraft equipment field, have been responsible for the design and precision manufacturing of many products, including

*Anti-G valves*
*High pressure reducing valves*
*Cartridge operated valves*
*Fuel system vent and relief valves*
*Electro-magnetic valves*
*Hot air reducing valves*
*Non-return valves*



## . . . by Hymatic

191

THE HYMATIC ENGINEERING COMPANY LIMITED · REDDITCH · WORCESTERSHIRE

Fly Aerocab—the modern executive air service

may we operate your company aircraft?

**NEWS FLASH**

Five twin engined Piper Apache Aircraft have flown in formation from America—4,000 miles at a speed around 150 miles an hour.

# PIPER

## THE MOST WIDELY USED BUSINESS AEROPLANE IN THE WORLD

**THE OXFORD AVIATION COMPANY LIMITED**

OXFORD AIRPORT · KIDlington 3061

*And at*

BIRMINGHAM AND COVENTRY AIRPORTS

*Sole sales agents for Piper aircraft (Oxford to the Scottish border)*

# Keeping the $H_2O$ out of the $C_8H_{18}$

You can trust a Fram Separator Filter to get the last traces of water and solid contaminants (down to 5 microns) out of aviation fuel.

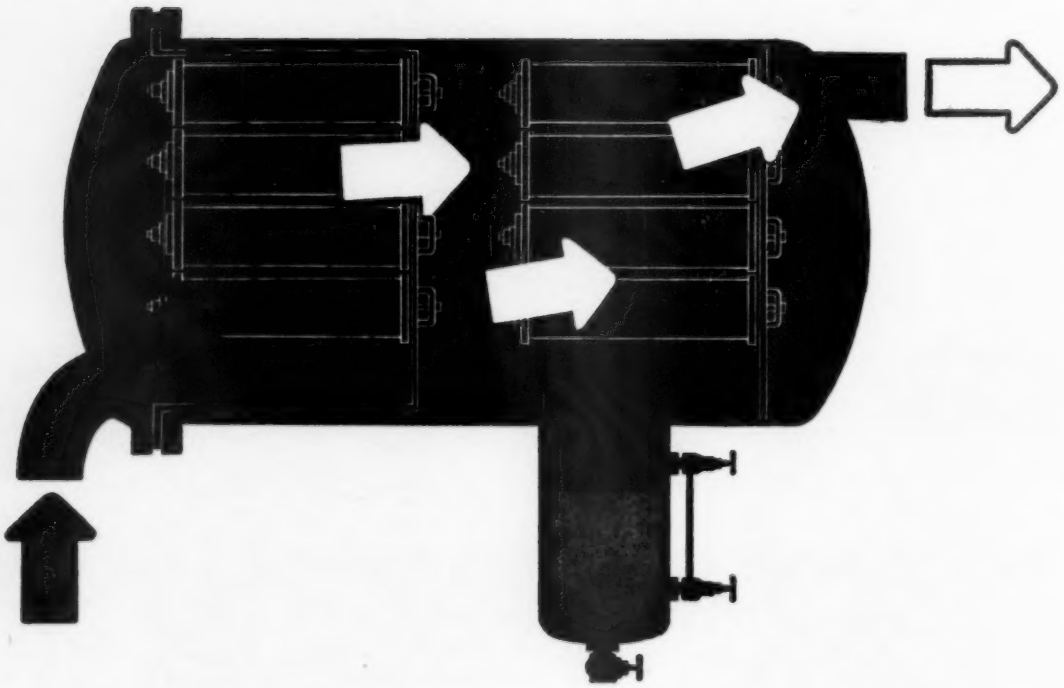
We have developed these units to conform to the latest and most stringent specifications such as MIL-F-8508A, MIL-F-15618E and MIL-F-26678A for water and dirt free aviation fuels and they are tested thoroughly in the Firth Cleveland Test House to guarantee faultless performance and long trouble-free operational periods.

Standard separator filters are manufactured to handle flow rates from 25 to over 1,000 igpm and trailer-mounted units are also available.

We have also developed a comprehensive range of Flow Rate Control Valves, Excess Flow Control Valves and Solenoid Operated Valves, pipeline Shock Alleviators, Fuel Filter Funnels, Tank Gauges, Level Controllers, Fuel Dispensing Vehicles and other aviation fuel handling equipment.

We shall be pleased to send you full information.

*Fram Separator Filters have been supplied to The Ministry of Aviation, The Admiralty, The 3rd United States Air Force, all major Oil Companies and they are in service at airfield installations and refineries throughout the world.*



# Fram Separator Filters

Simmonds Aerocessories Limited, 7 Cleveland Row, London, S.W.1. Tel: Whitehall 3100

*A Member of the Firth Cleveland Group*

CRC 10WS

# TOP-LEVEL BUSINESSMEN

## FLY Beechcraft

Interest in Beechcraft business aeroplanes is mounting among directors and management of forward-looking British organisations.

The advantages of having a personal aircraft to carry the men who matter on business are being increasingly recognised. Low operating costs, all-weather capability, high performance—these are only a few of the features of the quickest and most luxurious means of transport available today.

The distributors for Beechcraft in the British Isles are Short Brothers & Harland Limited. Each aircraft is backed by the full facilities of the Short organisation, which includes comprehensive maintenance service and spares stocks.

**The Beechcraft Queen Air**

Introduced last year and already providing owners the world over with profitable and pleasurable air travel, the all-new Beechcraft Queen Air will carry eight people and their baggage at cruising speeds up to 214 mph. Maximum range, with fuel allowances, is 1,200 miles and capacity payload can be carried more than 900 miles. The Queen Air represents a major advance in business aircraft design.

**The Beechcraft Travel Air**

Carrying five people in individual reclining comfort, the Beechcraft Travel Air cruises at speeds up to 200 mph. It has a maximum range, with fuel allowances, of 1,250 miles, yet uses little more fuel than many single-engine business aeroplanes.

**The Beechcraft Debonair**

Outstanding strength, comfort and economy have quickly established the Beechcraft Debonair, introduced a year ago, as the leading aircraft in its class. With individual seating for four people, the Debonair cruises at speeds up to 185 mph and has a maximum range, with fuel allowances, of 1,000 miles.

*In addition to the aircraft illustrated, the Beechcraft range includes:*

**BONANZA** 4 seats, cruise up to 195 mph. Max. range* 1,200 miles.
**BARON** 5 seats, cruise up to 220 mph. Max. range* 1,200 miles.
**TWIN-BONANZA** 7 seats, cruise up to 223 mph. Max. range* 1,400 miles.
**SUPER 18** 11 seats, cruise up to 214 mph. Max. range* 1,500 miles.

**with fuel allowances*

*Full information on all BEECHCRAFT aeroplanes is available from the British Isles distributors:*

## SHORT BROTHERS & HARLAND LIMITED

LIGHT AIRCRAFT DIVISION, QUEENS ISLAND, BELFAST, OR THE AERODROME, ROCHESTER, KENT

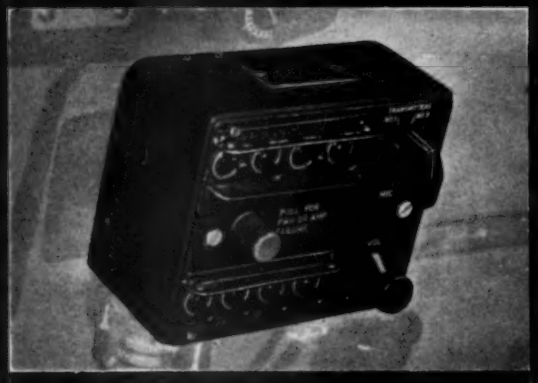
(Co-Distributors: Aircraft Associates Limited)

Calling

ELLIOTT

for

Audio Control Equipment



*Designed for all*

EXECUTIVE, PRIVATE & FEEDER LINE AIRCRAFT

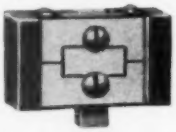
The ESB-31 Station Box is widely used in executive aircraft, and is fitted as standard equipment to all De Havilland Dove and Heron aircraft. The unit is small and robust, yet provides control facilities for up to seven receivers, four transmitters and interphone. Passenger Address facilities for operating up to six Elliott ESK-31C Cabin Speakers are optional. Versions of the station box are available to suit American or British radio installations.

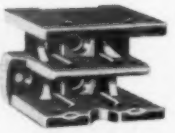
Jack boxes, junction boxes and cockpit speakers are included in the range of accessories which enables a complete audio control system to be supplied.

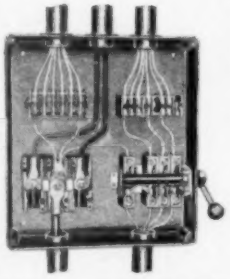
ELLIOTT BROTHERS (LONDON) LIMITED
Elstree Way · Borehamwood · Hertfordshire
*Telephone No: ELStree 5484*

AIRBORNE RADIO AND RADAR DIVISION

A Member of the Elliott-Automation Group







**assemblies**
**wiring systems**
**and**
**terminal blocks**

***for all aircraft and missile applications***

Reglo wiring system for aircraft, missile and general electrical applications.

The illustrations show some of the components of the Reglo wiring system which although originally designed for aircraft use, is now widely used by the Nuclear Energy Authorities and by Power Station Engineers.

It is an extremely flexible point-to-point system and unit construction of components makes assembly simple.

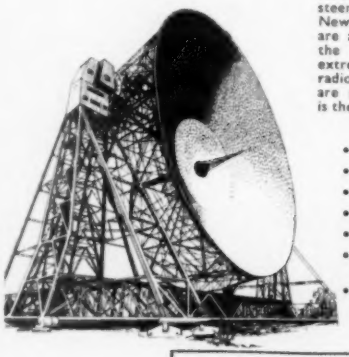
*Phone : Maidenhead 2275/7*
*Telegraphic address: DURAQUIP Maidenhead*

**C.W.C. EQUIPMENT LIMITED**
**Kings Grove, Maidenhead, Berks.**

Reglo

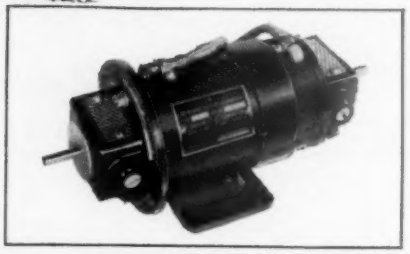


**How does NBD sight radio stars?**



At Jodrell Bank, the world's largest steerable radio telescope, there are Newton Derby servo motors. They are an essential link in orientating the 2000-ton telescope with the extreme accuracy demanded by the radio astronomer. When radio stars are sighted at Jodrell Bank, NBD is there.

- Servo Motors
- Permanent Magnet Alternators
- Motor Generator Sets
- Automatic Voltage Regulators
- Transistor Convertors
- Rotary Transformers and Convertors
- High Frequency Alternators (400 to 3,000 c.p.s.)



NEWTON DERBY

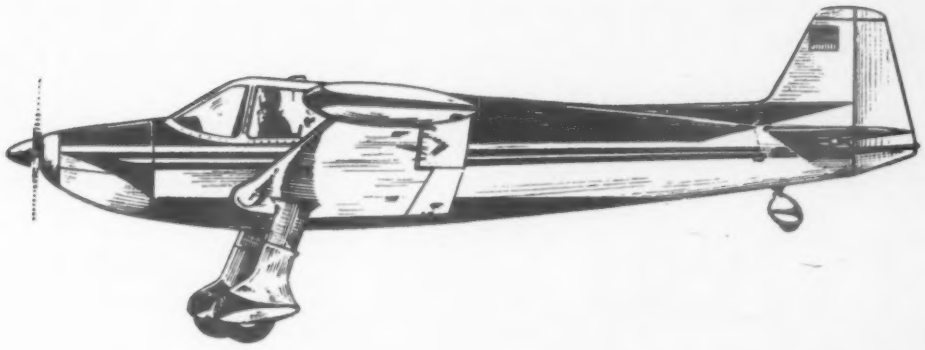
**NEWTON BROS. (DERBY) LIMITED**
**ALFRETON ROAD, DERBY**
*Telephone: Derby 47676 (4 lines)*
*Grams: DYNAMO DERBY*
*London Office: IMPERIAL BUILDINGS*
*56 KINGSWAY, W.C.2*

BÖLKOW

THE FOUR-SEATER

# BOLKOW F 207

## A NEW EXPERIENCE IN FLYING AND TRAVEL



★ Fully aerobatic

★ All round visibility

★ Economical fuel consumption

★ Cruises at 145 m.p.h.

★ Full Panel as Standard

**BÖLKOW-ENTWICKLUNGEN KG**
**BÖLKOW-APPARATEBAU GMBH**
OTTOBRUNN BEI MÜNCHEN

*Sole Agents for U.K.:*
FLAIR-AVIATION SALES COMPANY LIMITED
TOWER HOUSE, COLLEGE ROAD, BROMLEY, KENT
Tel. RAVENSBOURNE 7278/6414 AIRPORT - BIGGIN HILL, KENT

# Fascinating Flying

## in the latest 'Continentals'

The elegant Meta-Sokol

The superb twin engine Aero 145

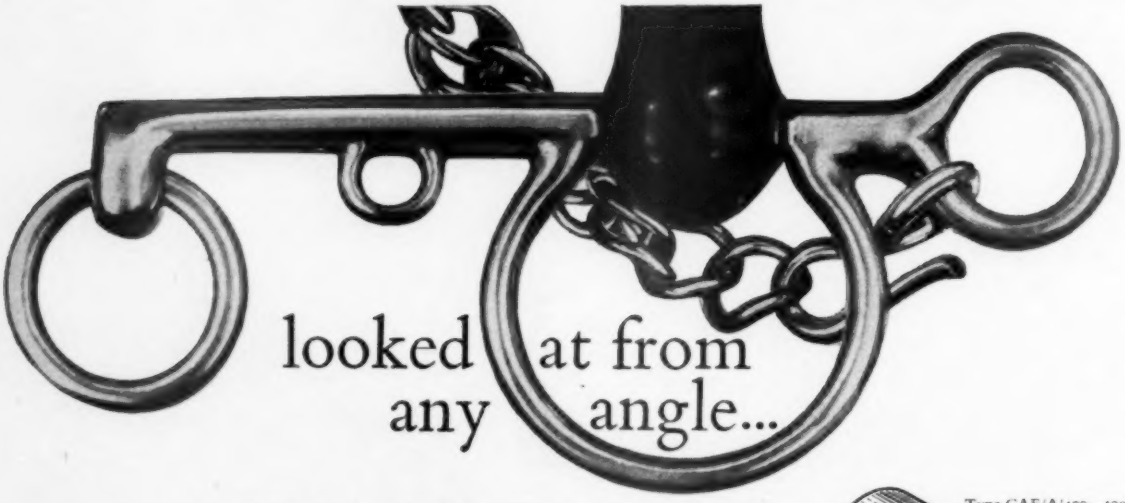
- Fuel Injection for economy and safety
- V.P. Propellers
- Retractable undercarriage
- Comfortable 4 seat cabin with exceptional all round view
- Comprehensive Standard Equipment
- Full spares backing

*World Export enquiries*

**OMNIPOL LTD**
WASHINGTONOVA II
Prague 3
Czechoslovakia

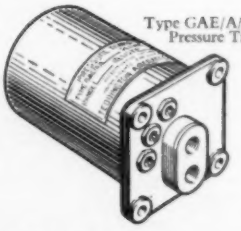
*For full information for these aircraft and also the superb MORAVA 5 seater and the famous ZLINN trainers write or telephone*

SOLE U.K. AGENTS **Peter S. Clifford & Co. Ltd.,**
Oxford Airport, Kidlington, Oxford
Telephone Kidlington 3355 — Evening and Weekends Bletchington 392
in conjunction with G/C Edward Mole, U.K. Distributor



looked at from any angle...

. . . Teddington have the bit between their teeth when it comes to the development of all types of aircraft controls. Hot air valves, fuel valves, time switches, temperature control equipment, pressure transducers, pressure regulators, anticing control equipment—all of them are built by Teddington and are essential components in virtually every British aircraft flying today.



Type GAE/A/400—599 Pressure Transducer

Teddington CONTROLS

REGD TRADE MARK

TEDDINGTON AIRCRAFT CONTROLS LIMITED
MERTHYR TYDFIL • SOUTH WALES • TELEPHONE: MERTHYR TYDFIL 3261
*London Office: Colnbrook By-Pass • West Drayton • Middlesex • Telephone: Colnbrook 2202/3*

TAC213

# NEW LIGHT EXECUTIVE

## Helio H 395 Super Courier

A new light executive plane carrying pilot and 4 passengers in car type comfort for as little as 6d per mile per passenger. Seen for the first time in this country at the Shackleton Aviation weekend.

- **Super short take-off:** 30 yards to 70 yards according to load.
- **Cruising speed:** 30 m.p.h. to over 170 m.p.h. with full control.
- **Positive control:** Large fin and rudder give good control under all conditions.
- **Ample horsepower:** 295 b.h.p. Lycoming engine with 3-bladed propeller.
- **Ground stability:** Provided by forward placed wide track undercarriage.
- **Service ceiling:** 23,500 ft.
- **Dimensions:** Wing span 39 ft. Fuselage 31 ft. long. Overall height 8 ft. 10 ins.

**Price £15,035** Duty paid and delivered.

Enquiries to the Sole U.K. distributors:

**McAlpine Aviation,** LUTON AIRPORT, BEDS.

the business flying division of Sir Robert McAlpine & Sons Ltd.

B

# rent·a·plane ltd

**We have New Piper aircraft available for contract hire to Flying Clubs and Groups, Business Users and Private Owners for a period of 12 months. Piper Colts can be hired for as low as £2-10-0 per hour.**

**Basis of Scheme.** The Operator pays a monthly hire charge in accordance with the annual utilisation he is prepared to guarantee, and the charge for any flying hours achieved in excess of the guaranteed utilisation is adjusted at the end of the period of hire.

The hire charges include the following:—

1. Depreciation.
2. The cost of Check and Annual Overhauls.
3. The cost of replacement parts as required.
4. Comprehensive Insurance.

Thus the Operators only outgoings in addition to the hire charges are:—

The Cost of Fuel and Oil.
Hangarage.
Between-flight inspections and Cleanliness.
Landing fees and other incidental operating expenses.

**We own the largest Piper aircraft hire fleet outside the U.S.A. For full details of hire charges and further information write to**

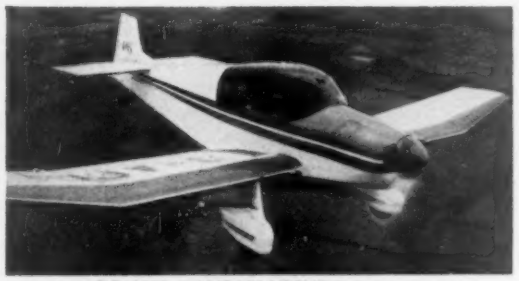
**rent·a·plane ltd**

**Kidlington Airport, Nr. Oxford.**

THERE IS A

# JODEL

FOR YOU



DR 1050 "AMBASSADEUR" 3 seater

D 140 "MUSKETEER" 4 to 5 seater

*U.K. AGENTS:*

**Rollason Aircraft & Engines Ltd.**
**Redhill Airport, Surrey**
**Phone: Nutfield Ridge 2212**

# THE BRITISH AVIATION INSURANCE COMPANY LIMITED

*The oldest and largest office specializing in Civil Aviation*

**HEAD OFFICE**
**3-4 LIME STREET, LONDON, E.C.3.**

Telephone: Mansion House 0444 (6 lines)

**BRANCH OFFICES**

**EDMONTON**
Imperial Bank Building, Jasper Avenue, Edmonton. Tel.: GArden 4-2247 & GArden 4-1808

**MONTREAL**
620 Cathcart St., Montreal 2. Telephone: UNiversity 1-7285

**TORONTO**
44 Eglinton Av. West. Tel.: Hudson 5-4461

**JOHANNESBURG**
401 Prudential Assurance Building, 94 Main Street, Tel.: 33-3048

**CALCUTTA**
Thapar House, 25 Brabourne Road, Calcutta 1. Tel.: 22-2157

**BRUSSELS**
99 Rue de la Loi. Telephone: 12.00.05

# Telecommunications

## BURNDEPT LIMITED

## LIGHTWEIGHT V.H.F. AIRBORNE TELECOMMUNICATION EQUIPMENT

BE.219, BE.255 & BE.256

### NEW MULTI CHANNEL V.H.F. LIGHTWEIGHT TRANSMITTER RECEIVERS. A.R.B. approved

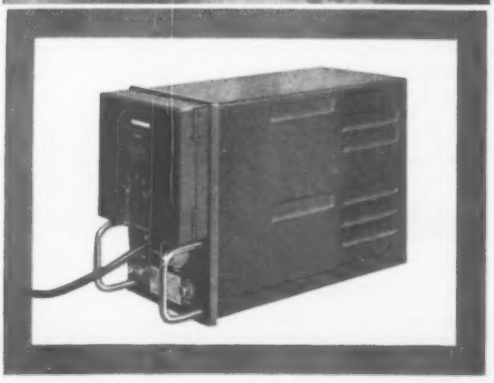
*BE.255*—116/132 Mc/s. complete kit. 5 Channels immediately available. Crystals can be changed while airborne. Size 11"×7¼"×4¾". Weight 8-lbs. Transistorized Power Supply—12 or 24 volts. Fully tropicalized—A.R.B. Approved.
In production and available at **£136. 7. 6d.**—Crystals extra.

*BE.256*—A fully remote-controlled (cockpit mounting control panel) version of BE.255 (116/132 Mc/s). Fully tropicalized—A.R.B. Approved.
In production and available at **£167. 10. 0d.**
—Drive cable and crystals extra.

### A popular single-channel V.H.F. transmitter receiver

*BE.219*—Single Channel V.H.F. emergency T.R. Completely reconditioned—E.I.D. release. 24-volt aircraft power supply or emergency battery. Size 9½"×4½"×7". Weight 9-lbs.
Price **£90. 0. 0d.**

***Above prices are subject to our usual terms and conditions of sale.***



ENQUIRIES WELCOME:

**CONTRACT SALES DEPT.**
**BURNDEPT LTD. ERITH, KENT.**
**Telephone Erith 33080.**

Makers of

THE SARBE U.H.F. SEA-AIR RESCUE BEACON
Now in production for the Royal Navy, Royal Air Force and the Royal Netherlands Navy

and of

The T.A.L.B.E. V.H.F. SEA-AIR RESCUE BEACON
In use by the Royal Navy, Royal Australian Navy, the Indian Navy and many Foreign Services.

"The Aeroplane" Photograph

AirCoupe

Immediate Delivery • Spares Service
Hire Purchase or Contract Hire available
at attractive rates

Sole Distributors for U.K. & Western Europe

**AIR RENT LTD.**

**STAPLEFORD AERODROME • ESSEX**

*Tel.: Stapleford 341/2/3* *Telegrams: Stapleair Romford*

***EUROPEAN AGENCIES AVAILABLE***

AIR ASSOCIATES

**A. J. WALTER LTD.**

SOLE AGENTS FOR

**AIR ASSOCIATES INC.**

**Full A.N. coverage, radio, wheels, brakes, tyres, instruments, propellers, accessories and all general spares for American light, executive and transport aircraft of all types.**

**A. J. WALTER LTD.**

**THE DRIVE · HORLEY · SURREY · ENGLAND**

**Telephone: HORLEY 1420 and 4294.**

**Cables: CUBENG HORLEY.**

*SHORT "SEALAND" AMPHIBIAN*

2 de Havilland "Gipsy Queen 70" engines. de Havilland variable pitch propellers. Six-seater Executive aircraft, fully equipped. Airframe hours 373 since new. Engine hours 28.40 and 265.40 since new. Propeller hours 373 each since new. C. of A. for one year.

THE AIRCRAFT THAT IS AT HOME ON SEA, LAND OR AIR

PRICE £12,450 (Flyaway U.K.)

*Enquiries to:* *A. J. WALTER LTD.*

The Drive · HORLEY · Surrey

Phone: HORLEY 1420 & 4294. Cables: "CUBENG" HORLEY

**The Prospector**

**BRITAIN'S MOST VERSATILE.... ...LIGHT AIRCRAFT**

| | |
|---|---|
| SIX SEATER | SURVEY |
| CROP SPRAYING | SUPPLY DROPPING |
| AMBULANCE | PARACHUTE TRAINING |
| FREIGHT | GLIDER TOWING |

The PROSPECTOR is unsurpassed in the world of light aircraft. Whatever your requirements the PROSPECTOR will fulfil them. Economical. Reliable. Sturdy. Easy maintenance. Short take-off. Short landing. Low operating costs.

**LANCASHIRE AIRCRAFT COMPANY LTD**

***SALES OFFICE:* 7 BERKELEY STREET, LONDON, W.1**

***Telephone: GROSVENOR 7721***

*Factory: Samlesbury Airfield near Blackburn* *Tel: Mellor 666* *Cables: Perair, Blackburn*

# RUMBOLD

A PHOTO OF A V.I.P. INTERIOR IN A VISCOUNT RECENTLY COMPLETED TO THE ORDER OF VICKERS-ARMSTRONGS (AIRCRAFT) LTD.

MANUFACTURERS OF SUPER LUXURY OR HIGH DENSITY SEATING TO ALL REQUIREMENTS.

RUMBOLD SEATS FLY THE AIRLINES OF THE WORLD.

**L. A. RUMBOLD & CO., LTD., KILBURN, LONDON, N.W.6**

TELEPHONE: MAIDA VALE 7366-7-8

## Norco Engineering Ltd.

**Sole U.K. representatives for Motoimport — Warsaw introduce the KOS PZL 102B Club and Business Aircraft**

Specification includes :—

Continental C.90-12F engine.
All-metal construction.
Aerobatic.
Hydraulic brakes.
Side by side dual control.
Low maintenance cost.
Delivered with complete set of spare parts, tools and maintenance accessories.
Comprehensive range of spares held in U.K.
This is one of the least expensive all-metal, ARB approved Club aircraft available in this country.

*For full details write or phone*

**Norco Engineering Ltd.**

**62 Church Road, Burgess Hill**

Burgess Hill 85678

## WASSMER SUPER IV

For your new Touring and Executive Aircraft why not consider this new craftsman-built machine which offers :—

*Lycoming 180 h.p. engine—high speed cruise—all round vision—very rugged construction which ensures low cost maintenance—long range—luxurious cockpit with ample room for four adults and baggage.*

*All details from*

**HANTS & SUSSEX AVIATION LTD.**

**THE AIRPORT, PORTSMOUTH**

**63051**

We offer spares backing and full facilities including maintenance and engine overhaul.

*The Lycoming Specialists*

## The RALLYE is coming!

A demonstrator of this all-metal three-seat light aircraft will arrive in England this June.

*Consider these points :—*

- ★ Continental 100 h.p. engine.
- ★ Easy to fly.
- ★ Safe to fly, fully slotted.
- ★ Unspinnable.
- ★ Lands at 35 m.p.h.
- ★ Over 300 ordered with deposits paid from 21 countries.
- ★ U.K. price **£2,450** duty paid.

*Send for details and book your demonstration now! Write, phone or call.*

**London Aero Club Ltd.,**

**Panshanger Aerodrome, Nr. Hertford**

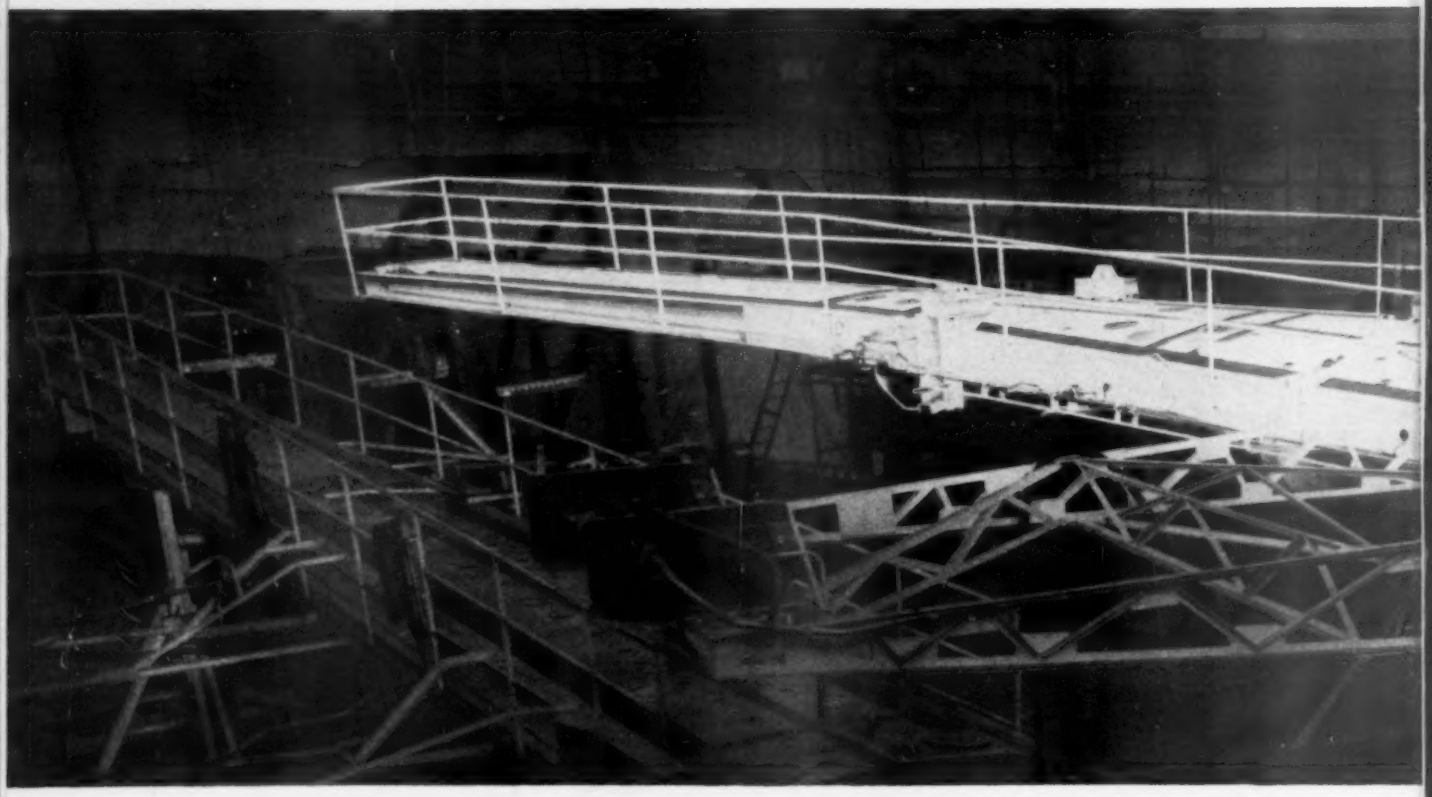
*Essendon 305*

**or**

**142-8, Edgware Road, London, W.2**

*Paddington 7661-2-3*

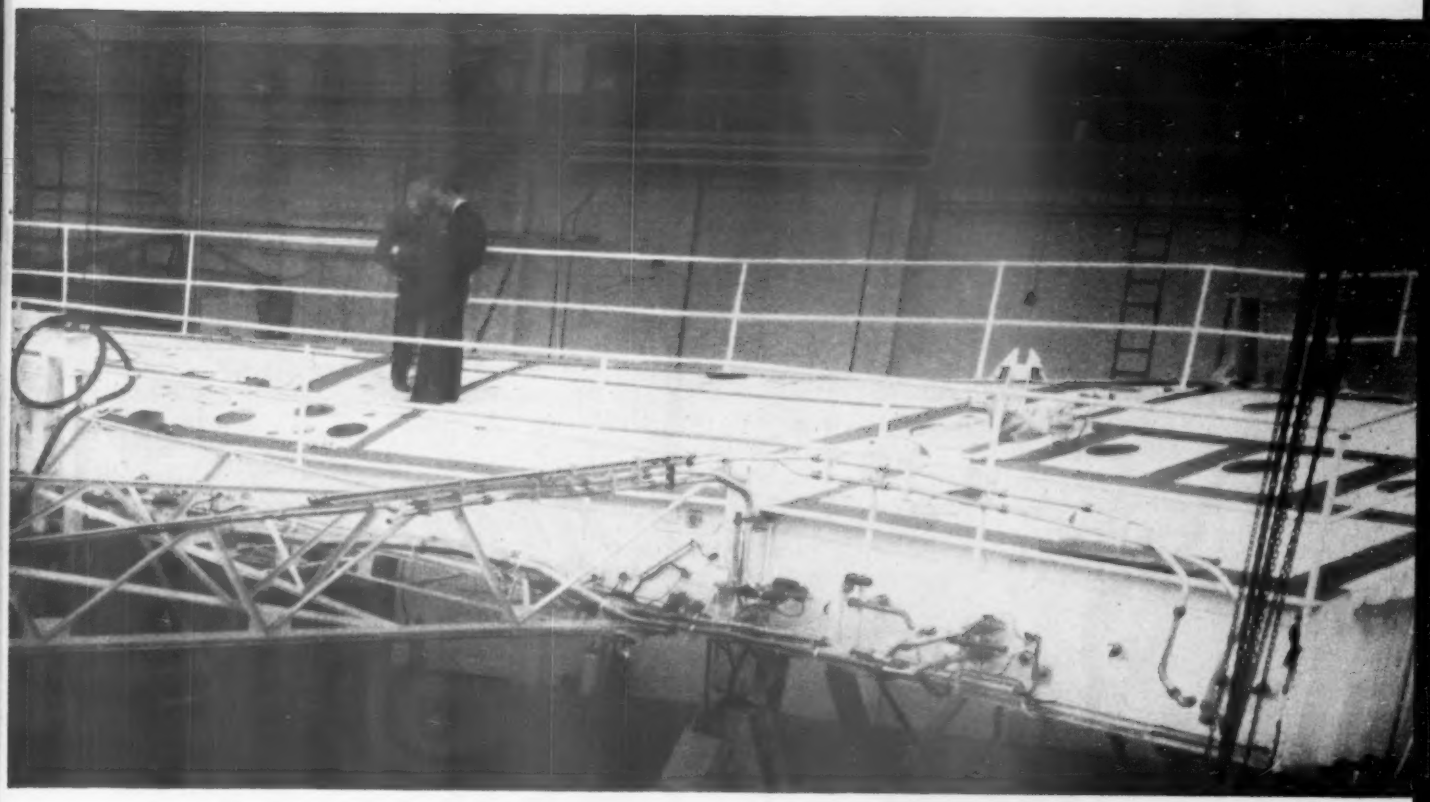
# Smiths are in the picture



*This is one of seven indicators in the VC.10 fuel load control panel which enable any desired weight of fuel to be selected for the tank concerned. These gauges automatically control fuel load in their respective tanks to pre-set quantities.*

The Smiths Waymouth Type 4 transistorised fuel contents gauging system is fitted for testing purposes to this full scale replica of a Vickers VC.10 port wing and centre section built at Weybridge. The Waymouth system has been specified for all production VC.10's to date. It incorporates a unique fuel load control panel located in the underside of the port wing, from which ground crew will be able to control accurately the entire fuelling operation, with overloading automatically prevented. The highest fuelling rate ever achieved—1,000 Imperial gallons a minute—enables the VC.10's thirst to be slaked in some seventeen minutes.

To all in aviation, Smiths—a name with a world of meaning—means service in instrumentation, from drawing board to installation . . . and beyond. Whatever the instrument problem; fuel measurement, flight control, engine or navigation, call in Smiths to put you in the picture.



SM91

# SMITHS AVIATION DIVISION

KELVIN HOUSE, WEMBLEY PARK DRIVE, WEMBLEY, MIDDX. *Telephone* WEMBLEY 8888 *Telegrams* AIRSPEED, WEMBLEY. *Telex* 25366

QUICK TURNROUND
GREATER PROFIT MARGIN
MORE FLIGHTS
LOW OPERATING COSTS

# AEROLINEAS ARGENTINAS

## order the AVRO 748

Later this year the Avro 748 goes into service with yet another progressive airline: Aerolineas Argentinas, the national airline of Argentina. Nine 748s have been ordered, and will operate on a network of internal routes.

Built by Hawker Siddeley Aviation, the Avro 748 is the world's most modern, low-cost turbo-prop airliner. It is adaptable, versatile, and extremely economical in operating cost and maintenance.

Powered by two Rolls-Royce Dart engines, the aircraft was designed for easy accessibility and speedy, efficient maintenance. In the face of growing competition in commercial flight, airlines equipped with the Avro 748 will look with confidence to the future.

For full details on this remarkable aircraft, write:
**HAWKER SIDDELEY AVIATION**
32 Duke Street, St. James's, London, S.W.1.

THE AEROPLANE and ASTRONAUTICS

VOLUME 100 NUMBER 2585 MAY 4, 1961

# Business Aircraft: Tools for Management

Although the precise number is difficult to estimate, because there is no separate classification in the British register, it is certainly true that more than 100 aircraft are in use solely for business purposes in the United Kingdom at the present time. Many others are registered in the names of companies, and are probably used jointly for business and other flying activities. Since its formation, towards the end of 1960, the Business Aircraft Users' Association has had interest expressed in its aims by several hundred British companies. Viewed as a potential market for aircraft, the field is unquestionably considerable.

In this annual issue, devoted to the requirements of executive and private operators, our directory section has been expanded to cover all those types likely to be of interest to our readers, and the tabulated data occupies twice the space of the equivalent total for the previous year. The emphasis in this issue is on aircraft and equipment, rather than operations. Care has been taken to include particulars of U.K. representation for foreign types, and prices where available.

The present time is notable for the re-emergence of interest in the light aeroplane field by the British industry, after a long period of concentration on more costly and involved projects. In this connection, a particular welcome must be extended to BEAGLE, whose initial products are reviewed in this issue. The long-awaited modernization of the Auster series was accomplished, once launched, in a remarkably short time, and the new Airedale undoubtedly poses a potent challenge, in price, performance and appeal, to the trans-atlantic products which have hitherto held undisputed pre-eminence in this country.

Although current preoccupation is largely with business flying, which in most people's minds holds the greatest scope for expansion, it would be wrong to ignore the need for a flourishing club and sporting flying movement. Here must lie the roots of any eventual growth towards the sky; in the absence of a large turnover of aircrew from the Services, the clubs could become an important source of pilots for business and commercial flying.

A less negative attitude towards the flying clubs by the Government would be most welcome. In the meantime, the gesture of the British aircraft industry in establishing a low-interest trust fund to replace the lamented Kemsley Flying Trust, will be of great value in helping the clubs with their pressing problems of re-equipment.

At Baginton Shackleton's Aviation Weekend showed how real is public interest in practical aviation. The range in price was as wide as the range in performance. And, as Mr. Masefield writes in this issue, there is room for everyone in the air—and safely. In such conditions growth of executive aircraft registrations should be impressive.

However, though Shackleton's Show may have had as many different types in the air as fly at Farnborough, a visitor could find hardly a trace of equipment on show. As the success of executive aviation is dependent on the effective use of radio and radar aids it is likely that increasing emphasis will be devoted to the selling of such equipment whenever owners, and potential owners of executive aircraft are gathered together. There is not always time for a customer to try out all the equipment in an aeroplane.

*Editor* - - - - THURSTAN JAMES
*Deputy Editor* - - - - F. T. MEACOCK

*Founder Editor* (1911-1939) *C. G. Grey*

*Proprietors* - - TEMPLE PRESS LIMITED
*Chairman and Managing Director:*
ROLAND E. DANGERFIELD

*Editorial, Advertisement and Publishing Offices:*
BOWLING GREEN LANE, LONDON, E.C.1

*Telephone:* TERminus 3636
*Telegrams:* "Pressimus London Telex"
*Telex:* 23839

Annual Subscription Rate: United Kingdom £4 15 0
Overseas £5 Canada and U.S.A. $15.00

©Temple Press Limited, 1961. The proprietors will consider any written requests to reproduce articles and illustrations appearing in this journal. Comment and brief extracts which acknowledge *The Aeroplane and Astronautics* are permissible.

# Matters of Moment

## Gnomes for Sweden

A SECOND large export order for de Havilland Gnome turboshaft engines was placed on Apr. 27 when a contract worth about £1 million was signed for the supply of these powerplants to the Royal Swedish Navy. This follows the recent £1 million order from Italy, by the Agusta company, for Gnomes.

Thus, within four months the de Havilland Engine Co., has received large orders for turbine engines from members of both the Common Market and Outer Seven. The latest order is the first for Gnomes to be installed in an American-built helicopter.

The Gnomes for Sweden will power Boeing-Vertol 107 and Agusta Bell 204B helicopters. The Swedish order for Boeing-Vertol 107s was announced on Apr. 28; it was stated then that the helicopters would be operated by the Royal Swedish Navy and Royal Swedish Air Force, and that eventually the 107 would be used by all three Services.

Sweden's order is for 1,250-s.h.p. Gnome H.1200s; engines of this type will be delivered to the Vertol division of Boeing later this year for military and civil approval tests. Gnomes are currently in production for Westland Whirlwinds and the twin-engined version of the Westland Wessex.

## American Spacemanship

UNLIKE the Russian space efforts to get a man into orbit, the American programme has been directed, right from the start, towards an initial manned-capsule sent over a ballistic trajectory reaching no more than 115 miles into space. This, of course, is a preliminary to an orbital mission later in the year using an Atlas as the launching vehicle. The aim of the initial exercise has been to launch a man on an "up-and-down" trajectory that would deposit him perhaps 290 miles down range. The final stages of the culmination of all this preliminary work were put into operation at the beginning of this week.

In this sense, America's first astronaut was intended to follow the trail pioneered by Ham, the chimpanzee which travelled over a similar course on Jan. 31. The results of that test, in which the Redstone booster over-performed and sent the capsule 155 miles into space and a distance of 420 miles, were recounted in our issue of Feb. 10, 1961, p. 152. On the same page was a diagram of the trajectory, showing the position assumed by the capsule during each stage of the flight.

A final test of the recovery system was made last Friday when a Little Joe booster carrying an unmanned Mercury capsule at its nose was launched from Wallops Island, Virginia. Although the rocket reached a height of only 14,000 ft.—instead of the planned 40,000 ft.—the capsule made a perfect separation and landed in the sea by parachute. N.A.S.A. emphasized that the escape was triggered under much more severe conditions than would occur during either the manned Mercury-Redstone (sub-orbital) or Atlas-boosted (orbital) missions. Again, officials stated that a man would have survived had he been aboard.

N.A.S.A. has given this picture of the procedure for the manned flight. Awakened at 02.00 hrs., the astronaut would breakfast and be given a final physical examination, put on pressure suit, and be driven to the launching site for final briefing before entering the space capsule.

Range clearance would be obtained at T (take-off time) minus 15 min. At T minus 2 min., cameras and tape recorders in the cabin would be switched on; finally there would be announcements of "ignition," "main stage" and "lift off."

After launching the astronaut has to check the flight timer on the instrument panel on which there are also mounted some 127 lights, fuses, switches, controls and displays. At intervals of 30 sec. throughout the flight, he reports on the functioning of the principal controls.

FREIGHTERS FOR B.E.A.—Lord Douglas, chairman of the corporation, with Mr. W. S. D. Lockwood, managing director of Armstrong Whitworth Aircraft, after signing the contract for the purchase of three Argosy freighters on Apr. 27. The first is due for delivery towards the end of the year (see p. 478).

COVENTRY CLIMBER.—One of the most interesting foreign visitors to the Shackleton week-end at Baginton was the Dornier Do 28 twin-engined STOL aeroplane. It is the only aircraft of this type available for executive use, and has a minimum flight speed of 25 knots.

*Photograph copyright "The Aeroplane and Astronautics"*

AIRBORNE AIREDALE. — A centre of great interest at the Shackleton Sales Week-end was the new BEAGLE-Auster Airedale—an attractive four-seater powered by a Lycoming. It is discussed in detail on pages 482-485.

*Photograph copyright "The Aeroplane and Astronautics"*

The capsule was planned to separate from the Redstone booster after about 150 sec. at approx. 4,500 m.p.h. and some 30 sec. later the capsule would be nearing the peak of the trajectory. Seven minutes after launching, the astronaut is called upon to move his fingers over the controls, with eyes closed, in order to discover how he can perform after being weightless for some 4 min. Finally, with re-entry accomplished, the recovery system goes into operation and the capsule drops gently into the sea beneath its supporting parachute.

It may be noted that it was von Braun's team at Huntsville that developed the Redstone rocket. This pioneer group, which has its roots in Peenemünde, the former V-2 research centre in Germany, produced for America two earlier "space spectaculars." It was, in fact, a modification of the Redstone which served as a booster for the four-stage vehicle which sent Explorer I into orbit on Jan. 31, 1958. On Mar. 3, 1959, the group's Juno II fired the first successful U.S. lunar probe past the Moon and into orbit round the Sun.

## Vital Researches

LAST WEEK'S news that Hawker Siddeley Aviation was to endow a readership and lectureship in noise and vibration research at Southampton University makes good reading indeed. These two interconnected phenomena have between them probably done more to bedevil aeronautical progress than anything else. And as time goes on their joint effects pose ever-greater problems so that the urgency for more research effort into these fields increases; the supersonic aircraft conference at Montreal, reported elsewhere in this issue, makes this plain enough.

Hawker Siddeley Aviation's contribution is the first from industry in support of a new General Appeal Fund soon to be launched by the University. The Aeronautical Engineering Department under Prof. E. J. Richards, has specialized in research associated with noise and vibration, and is receiving support from many sources including, for example, the U.S.A.F.

A Master of Science course will be established at Southampton to extend the research into these subjects. The first of these courses is planned to start in October, and the University will also offer short courses in acoustical subjects.

## Skybolt Insurance

ACCORDING to one newspaper report English Electric have received a contract to design a stand-off bomb, code-named Pandora, which would fly at very low level to avoid radar detection. It was stated that this air-to-surface missile would be carried by the TSR-2 and also used to extend the life of the V-bombers.

It could well be that Pandora has been credited to the wrong company. This weapon might be the one which has been attributed to Bristol Aircraft in the past and named "The Bat." Reports referred to this as a supersonic low-level stand-off bomb powered by ramjets. It was reported that it would take a zig-zag course to its target to confuse defences, and would have a 2,000-mile range.

Whatever the truth of these reports, two trends emerge. One is towards the development of an advanced stand-off bomb both as an insurance against the failure of Skybolt and as a weapon which would remain effective if defences against ballistic missiles were developed. The other is that the TSR-2 is likely to be used as a strategic aircraft to replace the V-bombers, despite the "tactical T" of its designation.

## *Air Matters in Parliament*

### Early Warning for V-Bombers

IN a written reply on Apr. 19 to MR. J. M. G. CRITCHLEY (Cons., Rochester and Chatham), who had asked what would be the cost of maintaining 10% of our V-bomber force on a standing air alert, MR. JULIAN AMERY, Secretary of State for Air, said, "because of its capacity for quick reaction to warning of an air attack the V-bomber force provides an effective deterrent without recourse to air alert." Although, in view of the attention already accorded to this problem, this is the reply one would expect, and represents no doubt a sincerely held opinion, the point is nevertheless an extremely important one. Speed of potential retaliation is not the only consideration; in a holocaust absence of body is more conducive to survival than presence of mind. However good the warning system may be today, the unremitting aim should be to make it even better tomorrow.

### Inter-city Helicopter Services

On Apr. 24 MR. N. N. DODDS (Lab., Erith and Crayford) and MR. G. R. CHETWYND (Lab., Stockton-on-Tees) returned to the charge with questions on our long-awaited inter-city helicopter services. Mr. Dodds invited a statement on progress, stressing especially the needs of London and Manchester and instancing progress in other countries. Mr. Chetwynd asked what is holding up development, when a decision will be taken on the Rotodyne and what assistance is forthcoming to B.E.A. to set the service up. MR. GEOFFREY RIPPON, Parliamentary Secretary to the Ministry of Aviation, referred his interlocutors to answers given in recent months (which we have reported), and said it must be some time before we could have an economical inter-city helicopter service, but that nothing is holding up progress. He went on to indicate, a shade coyly, that plenty is going on.

It is to be hoped that is so. But, up to the time of writing, we have no such service, economical or otherwise, and a deal more prodding may be necessary before we get one.

### A.T.L.B. Salaries

Later in the same session, again in reply to MR. CHETWYND, MR. PETER THORNEYCROFT, Minister of Aviation, stated that salaries for members of the Air Transport Licensing Board had been fixed as: chairman, £5,000; deputy chairman, £2,700; board members, 15 guineas a session. The Minister took note of a suggestion by SIR A. M. HARVEY (Cons., Macclesfield) that the chairman's salary should carry pension rights, but he felt it was reasonable as it stood.

### Tactical Arms for NATO

MR. F. ALLAUN (Lab., Salford, E.) asked the Lord Privy Seal on Apr. 26 whether, following the recent meeting between the Prime Minister and the President of the United States, the strategy of NATO to provide front-line units with tactical nuclear weapons has been altered. He was followed by MR. D. M. FOOT (Lab., Ipswich), who asked whether the Secretary of State for Foreign Affairs during his recent visit to America had made to or received from the U.S. Government any new proposals about the future supply of tactical nuclear weapons to West German armed forces. MR. E. R. G. HEATH stated that no new proposals had been made in either context, and reminded the House that it is already accepted NATO strategy to equip the shield forces with nuclear weapons for tactical use, and that any departure from this policy must be a matter for the North Atlantic Council as a whole, and not for member nations in isolation.—O. W. H. COOKE.

*Supersonic Conference at Montreal*

# Three Schools of Thought

THERE is, of course, no real doubt that a supersonic transport aircraft will be produced; there is also little doubt that, in spite of the problems which are still unresolved and which may remain in that condition for some time to come, it will be put into operation. The real uncertainty is the extent to which its own particular characteristics will limit its application—at least for the first generation of aircraft.

Throughout the Symposium on Supersonic Air Transport, which finished in Montreal on Apr. 21, the airlines have made it abundantly clear that they will not buy any aircraft which, for one reason or another, cannot be operated in a satisfactory manner. In this attitude they have had considerable backing from the government authorities responsible for the provision of airports and other facilities.

Before looking further at some of the specific matters discussed during the Symposium, it would be worth bearing in mind the summing up made by the chairman before concluding the proceedings. He described in essence the three main schools of thought prevalent among the manufacturers.

One manufacturer at least favoured as a first step a medium-range vehicle capable of operating sectors of between 600 and 2,000 nautical miles; such an aircraft would in any case complement the longer-range aircraft which were planned. Speeds of Mach 3 would not be justified, as in no case could a saving of more than 15 minutes be achieved by going faster than slightly over Mach 2. In the opinion of this manufacturer, construction of such an aircraft would be very much simpler; a lower cruising altitude of 60,000 ft. could be used; there would be no runway problems; and the problems of noise and sonic boom would be minimized. If the sonic boom could not be reduced to acceptable proportions, there would in fact be no supersonic transport aircraft at all—whether long or short range. In his opinion there was a considerable public demand for a medium-range aircraft, and he reminded those present that when subsonic jets were first introduced it was generally thought that they would be limited to long routes; they were now operating all kinds of services successfully, including some very short sectors.

The second philosophy considered that the right speed for a first generation supersonic transport aircraft should be only slightly above Mach 2—even though an appropriate range would be 3,500 nautical miles. There were far fewer problems involved in constructing such an aircraft, and there were already adequate data available for the use of light alloys. Steel might be suitable for Mach 3, but other materials needed may prove a limitation. The claim for a speed of Mach 2.25 rested on the fact that it provided a reasonable degree of novelty and did not try to go too far; both initial price and operating costs would be lower. Specific advantages would be that current fuels could certainly be used, the skin temperature would remain below fuel ignition temperatures, the demand on components would be more modest, and there would be more time available for testing, etc. There was a danger, in fact, that even after the delay needed for additional research and the cost of construction, a steel aircraft would be limited to a speed of Mach 2.75. Airlines would be wise to indicate a preference for Mach 2.25 as opposed to Mach 2.75 as, in the opinion of the supporters of the lower Mach number, the jump from 2.25 to 2.75 was greater than the change from subsonic to supersonic. Governments would be asked to pay a very heavy price for the extra 20 minutes saved over average ranges.

The third school, which appeared to have the greatest number of supporters, felt that the real advantages of the supersonic aircraft were only likely to appear when speeds of Mach 3 and over were achieved. There was little additional basic research required to advance from Mach 2 to Mach 3, and range efficiency definitely favoured Mach 3. The forecast figures for Mach 3 may well prove to be even better in practice. There was more experience available of the behaviour of steel and titanium at Mach 3 than of light alloys at Mach 2. More experience was really needed for both, but steel appeared to be a better proposition. Powerplant development was being concentrated on speeds in the neighbourhood of Mach 3 and, if transition from subsonic to supersonic had to be carried out at 40,000 ft., then the powerplants for Mach 3 were more suitable. The airframe designed for Mach 3 would have a longer life and the higher speeds, and, consequently, earning power, would offset the higher cost of manufacture: such aircraft might have a 20% advantage in cost per seat mile over aircraft designed for Mach 2—and it was probable that such an aircraft could be in service by 1970. It was important, moreover, for any prototype to have growth and, while an aircraft designed for Mach 2 would be limited to a maximum speed of Mach 2.25 unless radical changes were made, the Mach 3 vehicle could be developed to reach speeds of Mach 4 in due course. In these circumstances the Mach 2 aircraft would have a short life.

And there the matter rested.

The conference deliberately made no attempt to argue the relative merits of each of these propositions, but they have certainly given grounds for considerable cogitation. But the case is not really being settled here, nor are the decisions being wholly taken by the airlines. Brief but trenchant discussions on the way in which any supersonic project might be financed showed quite clearly that the money would either come from governments or it would not come at all—a point which must have been fairly obvious from the start.

Whether or not the Russians are building a supersonic transport aircraft is almost beside the point; so long as it is believed, which is certainly the case among U.S. manufacturers and, presumably, by the U.S. Government, the belief is just as potent as the fact. Fear is one of the most powerful human emotions, and the U.S. Government, after Sputnik I and Y. Gagarin, simply does not dare to accept anything which cannot beat all comers in its more obvious aspects, and the most obvious aspect of all is speed.

This being so, one can only assume that, as one of the conditions of assisting one or more of its constructors to produce a supersonic transport aircraft, the U.S. Government will insist that the highest practicable speed is achieved.

But again this particular conference has played a very important part. The airlines may not be the arbiters of speed, but they have made their views very clear about the other factors. The question of a surcharge for supersonic transport is out—or at least should be if the constructors can understand simple language. Any surcharge would in fact limit carryings so severely that the total number of aircraft required—estimated as being somewhere between 140 and 170—would be drastically reduced and any chance of profitable production completely eliminated. At least one U.S. manufacturer thinks that cost figures per seat mile will match or better those in subsonic jet transports.

Supersonic aircraft, moreover, must fit into the subsonic pattern so far as A.T.C. is concerned, and landing and approach speeds must be no higher than the present generation of aircraft. One manufacturer, who suggested increases in these two figures, received clear indications that this would not be tolerated.

Noise was a recurrent matter for discussion. It came back time and again, both in the plenary sessions and in the meetings of the individual committees, and it is plain that some acceptable solution to the sonic boom must be discovered if any supersonic aircraft is to be sold in other than miniscule quantities. There seems to be some hope that noise at airports and on take-off may be better than now, because wing loadings should not be very high and so much power will be required for transition that the relatively large engines necessary to accomplish this need not be operated at full power for take-off, with a consequent reduction in the speed of jet efflux.

Fuel is likely to present very considerable problems, certainly for the Mach 3 aircraft. Most cost estimates appear to have been based on the assumption that existing fuels could be used, at roughly existing prices with some upward adjustment of something in the neighbourhood of 5% or 10%. Discussions showed that this may be optimistic, depending on the temperature at which fuel can be maintained; if this is too high, special fuels with increased thermo-stability may be required, which may well increase the cost per gallon by 25%; alternatively, it may be impossible to use residual fuel for a second trip, and anything left in the tanks on arrival may have to be drained off—an interesting economic point considered against an uplift of something in the region of 190,000 lb. including 20% reserves.

This conference gave due warning—but warning can work two ways. Those in complete opposition to the idea—and there are quite a number—can marshal their forces of restraint just as effectively as those who wish to go ahead. Inaction is a lot less tiring than action, and widespread inaction can almost spell the doom of supersonic air transport. It is true, indeed, that the use of supersonic aircraft by smaller companies can present considerable problems, and their introduction must inevitably accelerate the present trend towards the interchange of equipment and the pooling of resources.

The stage is now set and the play must continue.

J. W. S. BRANCKER.

# Aviation News in General

**OPPORTUNITY WAITS.**—An opening exists on the editorial staff of THE AEROPLANE AND ASTRONAUTICS for a young man keen on aeronautical journalism, with a suitable technical background up to R.Ae.S. standards. Particulars, marked confidential, should be sent in the first place to F. T. Meacock, THE AEROPLANE AND ASTRONAUTICS, Temple Press Limited, Bowling Green Lane, London, E.C.1.

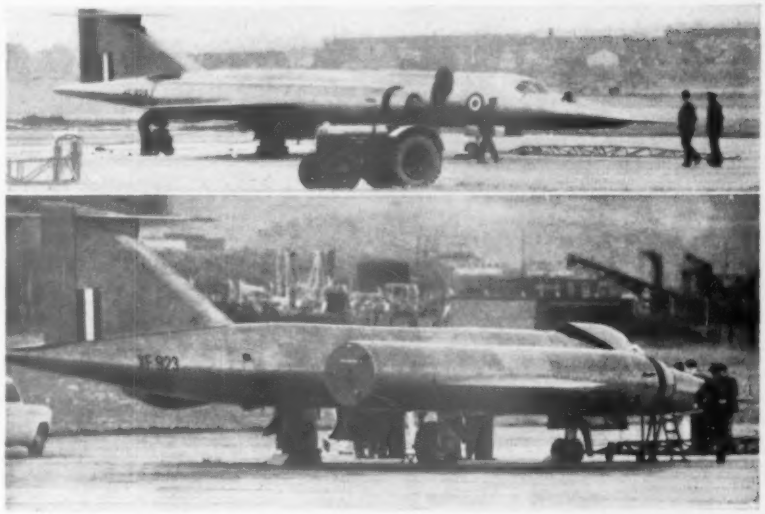
**HEIGHT RECORD.** — The Soviet Union is claiming a new World altitude record for the Type E-66 which has reached 34,200 m., approximately 112,200 ft. This type also established a World's speed record (which has since been surpassed) in October, 1959, when it attained 1,493 m.p.h. On both occasions it was piloted by Col. G. Mosolov. The last height record ratified by the F.A.I. for conventional take-off aircraft was 103,395 ft. achieved in December, 1959, by an F-104C Starfighter.

**SELWOOD ENGINE.**—Preliminary details were released last week of a new piston engine in which the cylinders and pistons revolve about different axes. Developed by William R. Selwood, Ltd., of Southampton, it is claimed to have a very high power/weight ratio and to be suitable for helicopters. No performance details are yet available.

**DASSAULT FIRST FLIGHT.**—The first Mirage IIIE (SNECMA Atar C) made its first flight on Apr. 5, piloted by Jean Coureau. The IIIE is a tactical support version which figures prominently in Armée de l'Air procurement plans.

**HUNTER RECORD.**—Subject to confirmation, a new London-Valletta, Malta, point-to-point record was established on Apr. 25 by two Hunter FGA.9s. Piloted by Wg. Cdr. H. Bennett, O.C. Flying, of R.A.F. Stradishall, and Flt. Lt. H. Davidson, of No. 1 Sqn., they covered 1,298 miles in 2 hr. 3 min. 8 sec., at 40,000 ft., averaging 633 m.p.h. The existing record of 2 hr. 12 min. 27 sec. was set up by a Royal Navy Scimitar in June, 1958.

**SEASLUG SUCCESS.** — H. M. S. "Girdle Ness," the Royal Navy's 8,580-ton guided weapons trials ship, returned to Devonport on Apr. 26 after almost two years of tests in the Mediterranean with the Seaslug SAM. According to the Admiralty "the system of operation has proved a great success."



ROLL-OUT I.—These photographs were taken on Apr. 26 when the Bristol 188 supersonic research aircraft was first rolled out prior to engine runs.

**X-15 REVISION.**—NASA has revised the speed reached by the North American X-15 on Apr. 21 to 3,074 m.p.h. The original announcement gave the fastest speed yet attained by this aircraft as 3,140 m.p.h.

**JET-FLAP RESEARCH.**—Additional information can now be given on the Hunting ER.189D jet-flap research aircraft which was first mentioned in our issue of Feb. 10. It has a high-set strut-braced wing and is powered by a single Bristol Siddeley Orpheus turbojet. The wing has full-span double-slotted flaps, the outer sections of which move differentially as ailerons. Most of the engine efflux is ducted along the wing and ejected over the upper surfaces of the flaps; the remaining engine thrust is used for balance purposes. The tail-plane is set high on the fin. The aircraft is a single-seater and has a tricycle undercarriage. Wing span is 44 ft., overall fuselage length with nose probe 51 ft., and height 15 ft. The first flight is expected towards the end of the year.

ROLL OUT II.—The STOL Breguet 941, which is expected to be one of the highlights at the Paris Aero Show later this month, was rolled out at Toulouse-Colombiers on Apr. 23.

# Commercial Aviation Affairs

**AVRO CONTRACT.**—A contract for three Avro 748s was to be signed by Skyways Coach Air, Ltd., yesterday, May 3. The company will receive the first 748 this autumn for route proving, and the remainder in time to put them into service on its cross-Channel routes next spring. Mr. Eric Rylands said that the purchase of additional 748s was being considered.

**A NEW CARAVELLE.**—Sud-Aviation is reported to be building five Caravelle VIIs as a speculative venture. The first is to fly next January and will be ready for service by October, 1962. Powered by General Electric CJ805-23C turbofans, the Caravelle VII is the first variant to differ dimensionally from the original design, having a slightly lengthened fuselage. The prototype, with standard fuselage length, will be exhibited at the Paris Aero Show.

**DECCA FOR LUTON.**—As part of the planned modernization programme for Luton Airport Decca 424 airfield control radar is being installed.

**Tu-114 IN SERVICE.**—On Apr. 24 the turboprop Tu-114 entered regular service with an inaugural flight on the Moscow-Khabarovsk run. This is the longest Aeroflot route and the 3,780 naut. miles were covered non-stop in 8 hr. 20 min. (454 kt. average) by the Tu-114 which is also reported to have been carrying a full complement of 170 passengers. The service has previously been operated with Tu-104s which made stops at Omsk and Irkutsk and took about 11 hours. The Tu-114 service will be operated twice weekly.

**FRIENDSHIP ORDER.**—Austral (Cia. Argentina de Transportes Aereos S.A.), the independent Argentine local and regional operator, has ordered four Fokker F-27s. To be delivered next March and April, they will replace DC-3s, C-46s and a DC-4 at present in use. The sale is the first by Fokker to a company in the Western Hemisphere, by agreement between Fokker and its U.S. licensee, Fairchild Engine and Airplane Corp.

**RIDDLE MERGER?**—Riddle Airlines (successful bidder for U.S. north-south scheduled cargo services and an A.W. Argosy operator) plans to acquire ASA International Airlines (Aerovias Sud Americana). The stockholders of Riddle are due to vote on the proposal tomorrow, May 5. The merger will lengthen Riddle's route system by more than 7,000 miles.

**PAY-ON-BOARD.**—Eastern Air Lines has introduced unreserved flights to and from New York, Boston and Washington. Passengers not only go direct to the airport, but may pay their fares on the aircraft if they wish. Seats have been promised for more than 1,000 passengers a day at each terminal with extra flights as necessary during peak travel periods.

**LONG BEACH-ROME.**—A DC-8 Series 50 (JT3D-1 turbofans) established a new record for commercial transports on Apr. 22 when it completed a non-stop flight from Long Beach to Rome (5,892 n. miles) as part of its F.A.A. certification programme prior to delivery to K.L.M. The time was 11 hr. 17 min. (527-kt. average). The take-off weight was 315,000 lb., including 152,000 lb. of fuel, of which 17,000 lb. remained after landing.

**HELICOPTER TAXI-RANK.**—A British United Airways Widgeon is now permanently stationed at Coventry Airport and a 24-hour service is offered at £45 per flight hour.

**T.C.A. IN LONDON.**—On Apr. 11 Trans-Canada Air Lines' new ticket office at 142-144 Regent Street, London, W.1, was officially opened by Mr. George Drew, Canadian High Commissioner in Britain.

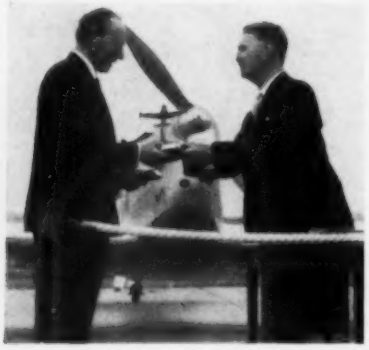
**INCREASED MINIMA.**—With effect from Apr. 22, the F.A.A. has increased by 100 ft. and one-half mile the ceiling and visibility landing minima for airline pilots having less than 100 hours of experience as pilot in command of the type of aircraft they are flying.

**JOHANNESBURG NON-STOP.**—On Apr. 22 an S.A.A. Boeing 707-344, with special wing tanks, flew non-stop from London to Johannesburg in 10 hr. 45 min.—an average of 456 kt. assuming a 4,896-n. mile Great Circle track. The flight showed that non-stop runs could be made to and from Rome (4,168 n. miles) with a useful payload.

**ACCIDENT REPORT.**—The CAB report on the accident to an American Airlines Boeing 707 in August, 1959, blames the pilot for failing to hold a yaw during a practice landing with two engines out on one side. The requirement for such landings has now been withdrawn by the F.A.A.; simulated engine-out landings are made at high altitude instead.

BUDAPEST-LONDON.—Regular air services between London and Budapest have been opened by B.E.A. with Viscounts and by Malev, the Hungarian State Airline using Il-18s, one of which is seen (left) at London Airport.

## *News About People*



SHUTTLEWORTH ADDITION.—Air Cdre. A. H. Wheeler (left), aviation trustee of the Shuttleworth Collection, receives a model of a Jet Provost from Mr. Arthur Summers, managing director of Hunting Aircraft, on Apr. 24 when Miss Jean Batten's record-breaking Percival Gull Six and a Jet Provost were handed over to the Shuttleworth Trust.

**ENGINE APPOINTMENT.**—Dr. E. J. Warlow-Davies has been made a director of Bristol Siddeley Engines, Ltd. He has been chief engineer (aero) and a special director of the company since its formation two years ago.

**PASHLEY PRESENTATION.**—Fifty years of active flying by Mr. Cecil L. Pashley, M.B.E., A.F.C., and also his 70th birthday, will be marked by a party and presentation at the Southern Aero Club, Shoreham Airport, on May 13. Mr. Pashley, who has logged more than 18,000 hr. is still giving flying instruction.

**HOVERCRAFT SPECIALISTS.**—Three new appointments announced by Hovercraft Development, Ltd., are Cdr. L. A. Sweny as managing director, Prof. H. B. Squire as a director and Mr. W. A. Pennington as chief engineer.

**ELECTRONICS CONTRACTS.**—In his capacity as the new contracts manager of W.S. Electronics, Ltd., Mr. P. Corcoran will be concerned with the promotion of the company's airborne telecommunications and aircraft telemetry equipment and systems, industrial electronic instrumentation and Government contracts.

**WHITE WALTHAM CHANGES.**—Mr. V. A. Benning has been appointed chief draughtsman of the M.L. Aviation Co., Ltd., to succeed Mr. A. J. Shirley who was made a director of the company last November. Capt. R. E. N. Kearney, R.N. (retd.), has joined the company as Naval liaison officer.

PRIZE APPRENTICE.—At the annual speech day for apprentices of Vickers-Armstrongs (Aircraft), Ltd. Mr. D. J. Priest received the Weeks Trophy for the outstanding apprentice from Viscount Portal of Hungerford, chairman of the British Aircraft Corporation.

# Shackleton's Shop Window

Photographs copyright "The Aeroplane and Astronautics"

Executive elegance—the Grumman Gulfstream climbs away at Coventry.

IN the face of considerable difficulty from the weather, and from the use of an airfield having only a single runway and lead-off strip, as well as being situated in a control zone, the annual sales week-end of W. S. Shackleton (Aviation), Ltd., at Baginton between Apr. 28-30 was the largest and most successful gathering of light and executive aircraft yet held. After heroic efforts, the control staff at Baginton eventually established a working technique to avoid complete saturation by the non-stop movements, and a second access point to the runway was hurriedly laid down. At times, however, aircraft queuing up for take-off resembled a Piccadilly traffic jam.

The new aircraft on display—nearly 50 in all from eight countries—were ranged in two long lines alongside most of the length of Baginton's 2,000-yd. runway, and a more compact arrangement might have made inspection easier. Behind them were lined up the 30 or so used aircraft available for sale, ranging from a £350 Miles Hawk Trainer to the opulently appointed DC-3 of Mr. Niarchos, for which £35,000 was asked. Its replacement, the Grumman Gulfstream of more than 10 times that price, was one of the visitors for the hour-long flying display programme held each afternoon. The single- and twin-engined Dornier STOL monoplanes clawed their way skywards at ever more alarming angles, the Do 27 contradicting all accepted conventions for high-lift aeroplanes by its vigorous upward rolls and stall turns, culminating in a dead-stick landing. Even more advanced performance was demonstrated by McAlpine Aviation's first Helio H-395 Courier, while the twin-engined Morava joined the unexpectedly aerobatic school with its upward rolls in the hands of Blaha.

The smart and elegant Airedale was naturally the focus of attention, and appeared excellent value for the £4,750 basic price, which includes constant-speed propeller and all equipment except radio. During the week-end Mr. Peter Masefield said that 10 Airedales were initially to be built per month, and a new company, BEAGLE Air Finance, had been formed to provide hire-purchase and rental facilities for both the A.109 and the Terrier.

Reappearance of the two-seat Student (above) under BEAGLE-Miles auspices was an unexpected feature of the Baginton display. A newcomer from Germany was the second prototype Bölkow 207 four-seater (below).

First orders for the new BEAGLE-Auster Airedale were for six from W. S. Shackleton (Aviation), whose managing director, Mr. F. A. Dismore, is seen handing over a cheque to Peter Masefield at Baginton.

Formal delivery of a Beech Queen Air to British Oxygen for executive use was made by Short Bros., the U.K. Beechcraft distributors, at Baginton. Mr. R. E. Harvey, Short's deputy managing director, hands over the log books to Mr. T. E. Potts, managing director of B.O.C., watched by David Keith-Lucas.

The prototype Avro 748 shows off its single-engined performance and potential for business flying use.

# Air Transport

## B.E.A. Buys the Argosy

BRITISH EUROPEAN AIRWAYS has become the first European airline to purchase pure freighter aircraft with its order for three Armstrong Whitworth Argosies. The contract—signed in London on Apr. 27 by Lord Douglas for B.E.A. and by Mr. W. S. D. Lockwood for Armstrong Whitworth—means that A.W.A. has now sold all 10 of the civil Argosies built originally as a £13-million private venture. The B.E.A. aircraft will be Nos. 1, 2 and 4 (G-AOZZ, G-APRL and G-APRN), the remainder of the batch having been sold to Riddle Airlines.

The first B.E.A. Argosy will be delivered in October and is to go into service in November, with the other two to be in service by February, 1962. It is planned initially to use the new aircraft on the all-freight services to Copenhagen, Milan and Manchester; eventually they will take over all B.E.A. scheduled freight flights, serving, in addition, Paris, Brussels, Nice, Rome, Dusseldorf, Frankfurt, Amsterdam, Glasgow and Belfast. These services are at present being flown by seven converted DC-3s (the Pionair Leopards), Viscounts and Yorks chartered from Dan-Air.

Eventually—two to three years after delivery—the three B.E.A. Argosies should achieve an annual utilization of some 2,200 hr. each, and produce a little over 16 million capacity ton-miles a year. This figure is about the same as the total freight ton-miles flown by the corporation in 1960, of which only one-third was moved on all-freight services. It is not intended that the Argosies should reduce the amount of fill-up freight carried on passenger services (which, as Mr. A. H. Milward pointed out last week, is the only profitable freight carried by B.E.A., or any other European airline). B.E.A. freighting at present develops less than 10% of the total annual revenue.

In addition to developing lower operating costs, the Argosy will be important to B.E.A. in permitting the corporation to carry large and bulky items which at present have to be turned away. At the IATA conference on European freight rates later this spring, B.E.A. will make a case for a lowering of freight rates—Lord Douglas would not say by how much—but is more concerned at the moment to simplify the commodity freight rates, of which there are more than 4,000.

With spares, the B.E.A. contract is worth about £1½ million. In addition to the aircraft, the corporation is buying the A.W.A. Rolamat cargo-handling system. Final details of the freight-handling system are still being worked on, but some form of standardization of pallets and handling equipment between the Argosy and other aircraft in the B.E.A. fleet is clearly desirable. The Argosy fleet itself will be a separate entity within B.E.A., with its own crews permanently attached; crew training has already begun.

Welcoming the B.E.A. purchase of Argosies, Mr. J. A. R. Kay, Hawker Siddeley sales director, noted that it was a further example of B.E.A.'s "Buy British" policy, for which his company was most grateful. In collaboration with the London School of Economics, H.S.G. has conducted a survey of future freight trends which indicates that a 30% reduction in freight rates in Europe would give a 60% increase in traffic, and a 40% cut would double the traffic. The same survey suggests that as much as 40% of the potential air freight could be carried only in a specialized freighter.

Now that A.W.A. has sold its 10 civil Argosies, production in the immediate future will be concerned wholly with the R.A.F. Argosy, but a further batch of 10 or more A.W. 650s will be fed into the line on speculation, possibly with some Government backing, and these will become available towards the end of next year. Meanwhile, three have been delivered to Riddle and two more will be going to this operator in the near future.

### TEAL for New Zealand

LAST week Senator Paltridge, the Australian Minister for Civil Aviation, announced that his government had agreed to sell to New Zealand its half share in Tasman Empire Airways, Ltd. The sale dates from Apr. 1, though payment will not be completed until March, 1965, and the purchase price is represented by the par £1 share value of £811,400.

Senator Paltridge stressed the fact that the agreement between the two governments "did not envisage the sale of TEAL to any outside interests." (Ansett-A.N.A. had recently offered to take over TEAL for a sum believed to be about £2 million.) The agreement gives TEAL and Qantas new operating rights in Australia and New Zealand.

TEAL was formed in 1940 for trans-Tasman operations, under the joint ownership of New Zealand (50%), Australia (30%) and the U.K. (20%). Since 1954 it has been a 50/50 partnership between the two Commonwealth countries. The fleet consists of 3 Electras, 3 DC-6s (ex-British Commonwealth Pacific) and 1 Solent 4 which is not now in service.

### U.S. Airlines in Trouble

RECENTLY issued figures for 1960 show that major U.S. airlines had their worst financial year for a decade. The net profit of the 12 top airlines, after deduction of taxes and interest, was about £350,000 in spite of record revenues totalling more than £700 million. The rate of return on investment was 2.9% and the profit margin was 0.6%.

In fact, only four of the main trunk carriers actually lost money—Eastern, Capital, National and Northeast. T.W.A., as already recorded, lost money on its domestic network, but came out on the credit side overall because of good results on international flights. These five airlines lost about £10 million on their domestic operations.

The president of the U.S. Air Transport Association, Mr. Stuart G. Tipton, described the 1960 situation as "dismal" and the future outlook as "serious." In his report he commented that "in 1949, when these airlines were doing only a quarter of the business they do now, they earned 10 times the 1960 profits."

The reasons include the minor business recession, coupled with the effect of a poor safety record; the higher-than-expected amortization and depreciation costs of the new turbojet equipment; the difficulty of selling surplus piston-engined aircraft; the large number of basically unprofitable routes; and, in the view of some airlines (see our issue of Apr. 27, p. 453), the excessive amount of competition on the heavy traffic routes.

### Birmingham's New Terminal

H.R.H. THE DUCHESS OF KENT formally opened the new terminal building at Birmingham Airport, Elmdon, on Apr. 28. The event marked the completion of the first year of the airport's operation by the Birmingham Corporation, to which it was returned by the M.o.A. on Apr. 1, 1960, and came 22 years after the Duchess of Kent had opened the original terminal at Elmdon. The new wing building will be used for international departures and arrivals; it has a customs hall and airline and administrative offices on the ground floor, and a well-appointed lounge, restaurant and bar on the first floor.

Work has now started on the original building to develop it for domestic operations. Further stages in the planned development of the airport include extension of the aprons, and of the main ILS runway 34 from its present 5,000 ft. to 7,000 ft. Total cost of these developments is nearly £1 million, of which the M.o.A. is contributing 60%.

During 1960, Birmingham Airport handled 284,000 passengers, an increase of 50% over 1959.

### More Boeings for T.W.A.

A FURTHER stage in T.W.A.'s re-equipment plans has been reached with the announcement last Monday of orders for 30 additional Boeing jet airliners. All the new aircraft, including four Boeing 720Bs to be leased from Boeing, will have turbofan engines.

The T.W.A. order, in addition to the 720Bs, comprises six 707-331Bs with JT3D-3 engines (these are basically 707-320Bs as ordered by Pan American in February) and 20 707-131Bs (basically 707-120Bs of the type put into service by American Airlines in March). Delivery will begin next September and be completed by October, 1962. T.W.A. already has 15 707-131s and 12 707-331s in service. Boeing jet airliner orders now total 400, including 92 Boeing 727s.

*Last year*

*BOAC flew*

*52,000,000 miles*

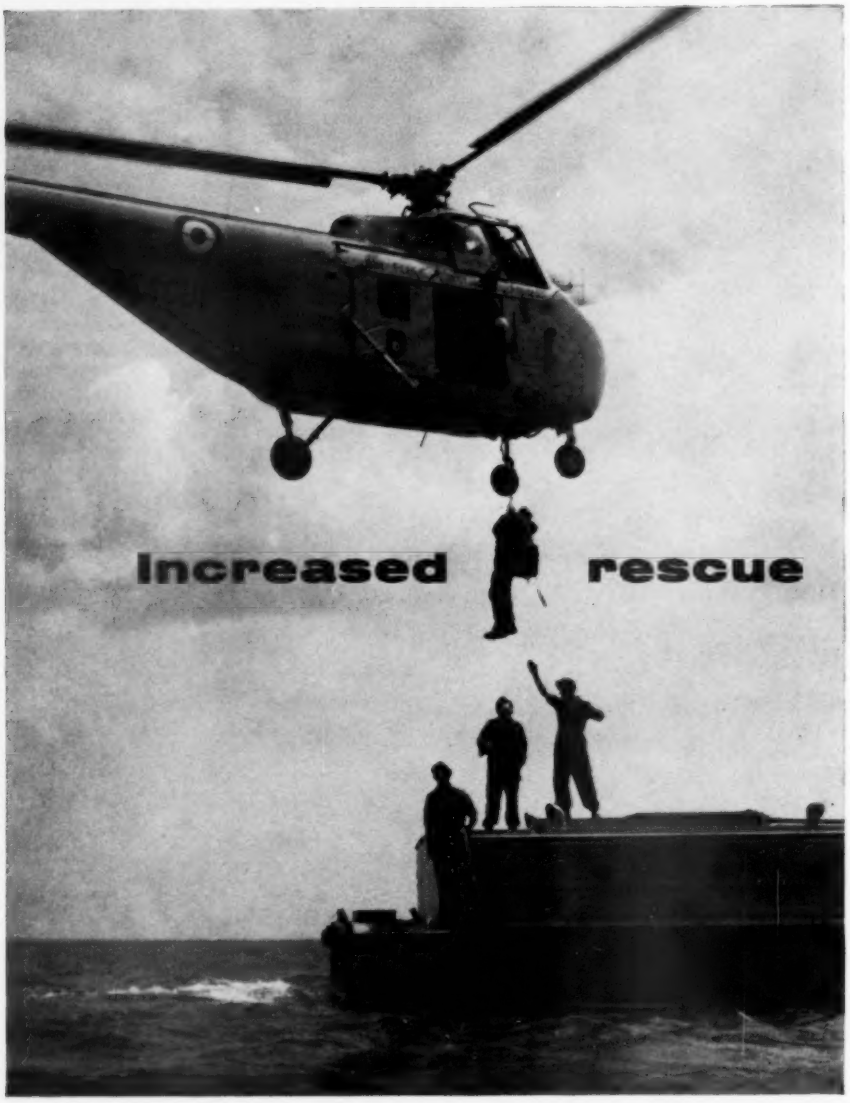
*on SHELL*

*AVIATION FUELS*

BOAC is sure of SHELL

*. . . so can you be*

D




The New Whirlwind Helicopter powered by the Gnome gas turbine engine has greatly increased power available at a much lower aircraft weight. The 1050 horse power of the de Havilland Gnome engine gives the Whirlwind exceptional high altitude and hot weather performance. The aircraft weight has been reduced by 650 lb. compared with the piston engined version. The Gnome Whirlwind can fly 90 miles, pick up eight survivors and return to base with ample fuel reserves. The engine power permits landing at 10,000 ft. with full load in conditions up to temperate maximum. Freight loads of 2,000 lb. can be carried or six stretcher patients together with a medical attendant. The large cabin makes the machine an ideal aircraft for a wide range of duties including 8-10 seat passenger transport, freighting, casualty evacuation, rescue and anti-submarine defence.

**WESTLAND** *the great name in* **HELICOPTERS**

**WESTLAND AIRCRAFT LIMITED · YEOVIL · ENGLAND**

Incorporating Saunders-Roe Division, Bristol Helicopter Division and Fairey Aviation Division

## *Air Transport . . . .*

# The Major A.T.L.B. Hearings

A PRELIMINARY timetable has now been published by the A.T.L.B. for the hearing of major applications from independent operators for air service licences. Hearings have been planned to begin at 2.30 p.m. on Tuesday, Jne. 20, and to continue thereafter on Jne. 21, Jne. 29 and 30 and Jly. 4, 5 and 6. On all but the first day the hearings will begin at 10.45 a.m. and continue until 4.30 p.m. with an adjournment for lunch. They will be held at the new A.T.L.B. headquarters at Therese House, 29-30 Glasshouse Yard, Aldersgate Street, E.C.1.

A total of 97 applications is now listed by the A.T.L.B. for consideration at these hearings, or approximately one for every 15 minutes of the time allotted. The applications are from nine operators, including the two corporations, and almost all have been opposed by one or more airlines.

They fall into several groups, of which the most numerous are those for European destinations to be served from London (Heathrow, Gatwick, or Southend); other applications to be heard are for services from provincial points to Europe, from London or the provinces to other domestic terminii, and from London to Africa and the Far East.

In some cases four or five operators are seeking rights for a single route. British European Airways, British United, Cunard Eagle, Silver City and Tradair, for instance, have each made an application to serve Genoa; and B.E.A., B.U.A., Overseas Aviation and Tradair have asked for licences on a route to Madeira. The position of the various operators which will figure in these hearings can be summarized as follows:—

**British European Airways.** Appears primarily as an objector to most of the applications from independent companies. Three B.E.A. applications — for London-Genoa, London-Malaga and London-Lisbon-Madeira—are included in the list.

**British Overseas Airways Corporation.** Like B.E.A., the principal rôle of the Corporation will be as an opponent to independent applications on routes to Africa and Asia. The B.O.A.C. applications to serve Brussels, Leopoldville, Stanleyville, Elizabethville and Usumbura on their existing services to Africa will be considered in the course of these hearings.

**British United Airways.** Has applied for a network of routes from Gatwick to European destinations and a few domestic services, some on a seasonal basis; another group of routes from Gatwick to African cities; and services to Tokyo and Singapore. Will also oppose applications from other independent companies.

**Cunard Eagle Airways.** Principal applications to be heard are for routes which almost duplicate the B.U.A. applications, which Cunard Eagle will oppose. A few domestic routes are also included.

**East Anglian Flying Services.** Applications for Birmingham-Basle-Zürich and Birmingham-Albenga (Italy) services are to be considered in relation to other companies' applications to the same or nearby destinations.

**Overseas Aviation (C.I.).** Most of this operator's applications in this series are for routes from the provinces to Europe or to other domestic terminals; they also include requests for Gatwick-Ostend and Gatwick-Madeira rights.

**Silver City Airways.** Three applications from this operator are included as they conflict with others in the list; they are for Lydd-Basle, Manston/Hurn/Gatwick-Marseilles-Genoa and Manston/Hurn/Gatwick-Lisbon-Madeira.

**Starways.** Applications to serve Dublin, the Isle of Man and Belfast from Chester will be considered.

**Tradair.** This company has applied for licences on nine routes from Southend to European points. Most of these conflict with applications already made by B.U.A., Cunard Eagle and others, but the Tradair services would be available only to travel agents making block bookings (minimum of six seats in a Viking or 10 in a Viscount) for inclusive-tour parties. The applications are not being made in conjunction with any specific travel agent, however, and A-class licences are necessary.

## Air Afrique Revised

PLANS made last year by Air France and U.A.T. to form a subsidiary company for operation in Africa have been modified following the recent meeting between the heads of 11 independent (formerly French) African states at Yaounde, in Cameroun. The operating name Air Afrique is to be retained for the new company, but each of the 11 states is to contribute 6% of the working capital of 10 million NF (£723,000). Air France and U.A.T. will each contribute 17% of the capital. The African states concerned in the establishment of Air Afrique are: Cameroun, Republique Centrafricaine, Congo (the former French Congo), Côte d'Ivoire, Dahomey, Gabon, Haute-Volta, Mauritaine, Niger, Sepegal and Tchad.

The headquarters of Air Afrique will be in Abidjan, where a general meeting is to be held on May 25 to appoint senior executives including the president and director general. Completely autonomous operations are scheduled to begin by Jly. 15, but aircraft will be operating in Air Afrique markings from next month. Initial equipment will comprise the 15 DC-4s used at present by Air France and U.A.T. for their African network. Initially, services will be flown domestically within the 11 states, between these states and regionally in Africa. Intercontinental services to the Middle East, Europe and North America are to be planned eventually.

## P.I.A. and Its 720s

THE approval by the Pakistan Government of the purchase by Pakistan International Airways of three Boeing 720Bs (see our issue of Apr. 20, p. 419) is an outward symbol of the way in which P.I.A. has developed its financial and operational status during the past two years.

The order involves about £9.6 million, including spares; of this, about £1.92 million (or 20%) will be financed from P.I.A.'s own resources and the remaining 80% will be a loan from the Export-Import Bank of Washington which will be repaid from future operating profits.

Since 1958, P.I.A.'s financial position has been steadily improving, with an increase in revenues of 91% during the past two financial years. For 1959-60 there was a net profit of about £480,000 and the 1960-61 financial year is expected (according to the airline's managing director, Air Cdre. Nur Khan) to end with a profit of some £690,000 and an operating revenue of well over £8 million.

About 85% of P.I.A.'s operations are now profitable and an interesting feature has been the expansion of cargo ton-mileage —principally on services between the two wings of the country. Unusually enough, P.I.A.'s cargo now provides 21.9% of the total annual revenue—which is probably as high a percentage as that of any other major "mixed operations" carrier.

The international long-haul turbojet services—initially operated with 707s leased with flight crews from Pan American, and later with leased 707s and P.I.A. flight crews—have been unexpectedly successful. More than 40% of the passenger traffic is non-Pakistani and the operations showed, for instance, a profit of nearly £30,000 for the month of March, with a schedule regularity of 93.5%. One of P.I.A.'s essential objectives is to ensure that foreign exchange earnings on international routes are sufficient to cover foreign exchange expenditure on domestic operations—thus becoming self-sufficient in terms of foreign exchange requirements.

The first 720B will be delivered at the end of this year and the other two later in 1962. A twice-weekly 720 service between Karachi and Dacca will be introduced next January if Dacca's airport extensions are complete. Frequencies on the Karachi-London and this year's planned once-weekly trans-atlantic services will be increased and the Karachi-Dacca and Dacca-Lahore services will, in due course, become all-turbojet operations.

B.E.A. ALL-FREIGHTER.—An impression of the A.W. Argosy in the colours of B.E.A., which, as recorded on an earlier page, has ordered three.

# More about the Vostok

SLOWLY, more details of Major Gagarin's orbital journey are beginning to filter through. A long article in *Izvestia* includes details of the spacecraft's cabin; gives further information on the instruments it contained, and shows that it carried two television cameras.

A certain amount of confusion had resulted earlier from Major Gagarin's own statement that the Vostok "did not carry a single camera," which was in conflict with the original Tass statement that "the condition of the navigator in flight is observed by means of radio telemetric and television systems." It is now clear that Gagarin was referring specifically to cameras for ground observation. Of the two cameras in the cabin, one transmitted a picture of the astronaut in full-face and the other in profile.

The much debated time when Gagarin is said to have reported he was "over South America"—originally given by Tass as 9.15 a.m. (Moscow time)—was corrected by *Red Star* on Apr. 13 to 9.52 a.m. *Izvestia* confirms this, adding that at this time Gagarin was in the vicinity of Cape Horn. The Vostok's automatic orientation system was switched on at 9.51 a.m. After the spacecraft emerged from the Earth's shadow this system determined the ship's orientation with respect to the Sun.

*Izvestia* continues: "At 10.15 a.m. the automatic programming device gave commands to prepare the ship's apparatus for switching on the retro-rocket. At that moment, the ship was over Africa and a regular report was received from Gagarin on the progress of the flight.

"At 10.25 a.m. the retro-rocket was started and the ship left the orbit, assuming the trajectory of descent. At 10.35 a.m. the ship began entering the dense strata of the atmosphere . . . and landed in the predetermined area at 10.55 a.m."

As we reported last week, *Izvestia* confirms that the spaceship consists of two main components—the pilot's cabin and the compartment for the instruments and retro-rocket.

"All the instruments are controlled automatically by means of programming devices on board the ship, or if necessary, by the astronaut. Although the programme for the first manned flight provided for only one revolution round the Earth, the structure and the spaceship's equipment permit longer flights.

"Before the landing of the pilot's cabin the landing system is switched on at a definite altitude and thus the cabin actually descends at a low speed. From the moment of switching on the retro-rocket to the landing, the spaceship covered 8,000 km. The descent lasted 30 minutes.

"The cabin has three portholes and two quick-acting hatches. The glass in the portholes is heat-resistant and enables the astronaut to make observations throughout the flight. The pilot sits in an ejector seat which enables him to leave the spaceship in the case of emergency. During the flight the astronaut was wearing a protective space-suit ensuring his safety and ability to work even in the event of the hermetic sealing of the cabin being broken during flight."

The Soviet newspaper also states categorically that "the astronaut can land without leaving the cabin." This method it relates, "was tested with the help of the fourth and fifth Soviet satellite spaceships which had experimental animals in their cabins."

"Another possible variant," the report goes on, "is that the seat with the astronaut is catapulated from the cabin at an altitude of about seven kilometres and then descends with parachutes. This method was also tested during the experimental launching with animals" (i.e., in the case of the Strelka and Belka 18-orbit mission on Aug. 19-20, 1960).

"An air-conditioning system maintains in the pilot's cabin normal pressure, normal oxygen concentration and a concentration of carbon dioxide not exceeding 1%, a temperature ranging from 15 to 22 degrees, and relative humidity between 30 and 70%. The air is regenerated with the help of highly active chemical compounds.

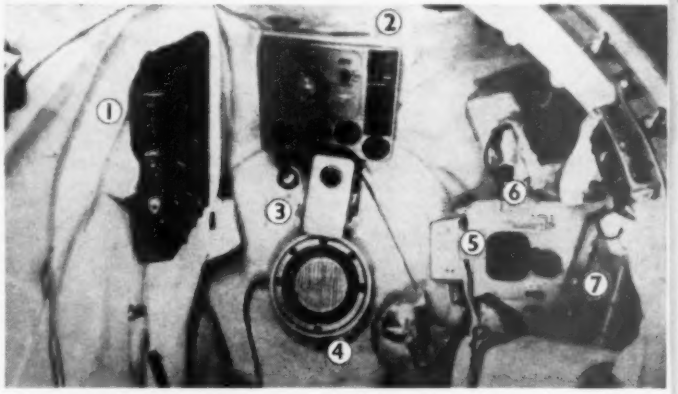
"A liquid cooling agent absorbs the heat in the pilot's cabin. The orientation system ensures automatic scanning of the Sun, the necessary turn of the ship, and keeps it in the required position with great accuracy.

"The ultra-short-wave channel of radio communication is used for contact with ground posts at a distance of up to 1,500-2,000 km., ensuring communication with ground stations on the territory of the Soviet Union over the greater part of the orbit.

"The instruments in the astronaut's cabin include a globe, whose movement is synchronized with the ship's movement along the orbit permitting the pilot to determine his position throughout the flight.

"Although the first Soviet satellite spaceships have confirmed the great reliability of the equipment, additional measures were taken in the Vostok to exclude any accidents and guarantee the safe flight of a man in this vehicle."

*Izvestia* emphasizes that all the instruments on board, including the orientation system and the landing apparatus, were operated automatically. But, in emergency, the pilot had the ability to take command himself. "The astronaut can determine by means of an optical indicator the ship's position in relation to the Earth, and also preselect, by means of the globe, the landing place if the retro-rocket is switched on at any given moment.




Interior of the Vostok's cabin. Key: 1. Pilot's control switches; 2. Instrument panel with rotating globe; 3. Television camera; 4. Porthole with optic orientator; 5. Orientation control handle; 6. Radio receiver; 7. Food container.

"The ship's design also allows for the astronaut's descent to the Earth, in the event of failure of the retro-rocket, by the natural action of atmospheric drag" within 10 days. Adequate supplies in the ship can be maintained for this period.

According to the *Izvestia* article, Soviet scientists and designers did not consider it necessary to perform preliminary experiments with rockets launched on ballistic trajectories but concentrated on "creating heavy satellites and big spaceships. . . . The task, new in principle, was to design the orientation systems of satellite spaceships to solve the problem of their return to Earth.

"As a result of strenuous work, the Vostok spacecraft was built. Two final test launchings of this ship were made in March this year. During these flights a dummy was placed in the pilot's seat. Experimental subjects—the dogs Chernushka on Mar. 9 and Zvezdochka on Mar. 25—were also in the cabin."

From the picture of the cabin interior and the information given it seems that Gagarin lay with his feet drawn up on an ejector couch within the pressure cabin looking up at the instrument panel with the globe, the central viewing port, and the "full-face" TV camera. At his right hand would then be the orientation control stick, the radio receiver and the food container, and at his left hand, the control switches.

As previously stated in our article, "Man's first Orbit in Space" (Apr. 20), it appears likely that the astronaut's couch was pushed into the spacecraft on rails, after the fashion of the ejectable dog-capsule of Spacecraft II. It would probably be ejected from the cabin through one of the "quick-acting escape hatches," allowing the astronaut to make his separate descent by parachute.

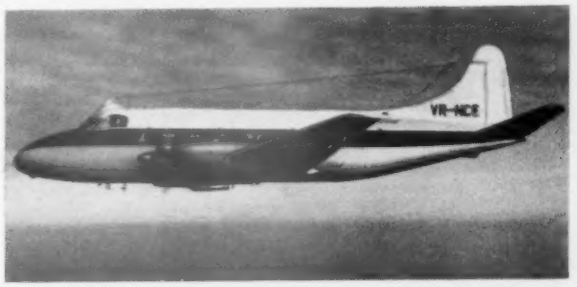
The weight of the Vostok spaceship without the last stage of the carrier rocket was 10,418.6 lb. The perigee of the orbit, according to the latest analysis of tracking information, was 112.4 miles, the apogee 203 miles, and the orbital inclination 64° 57'.

From the foregoing, it will be seen that *Izvestia* does fill in one or two gaps of the technical story surrounding Russia's first man in space. But it still does not reveal the appearance of the spacecraft itself or the precise method of its re-entry and landing.—K.W.G.

# DE HAVILLAND

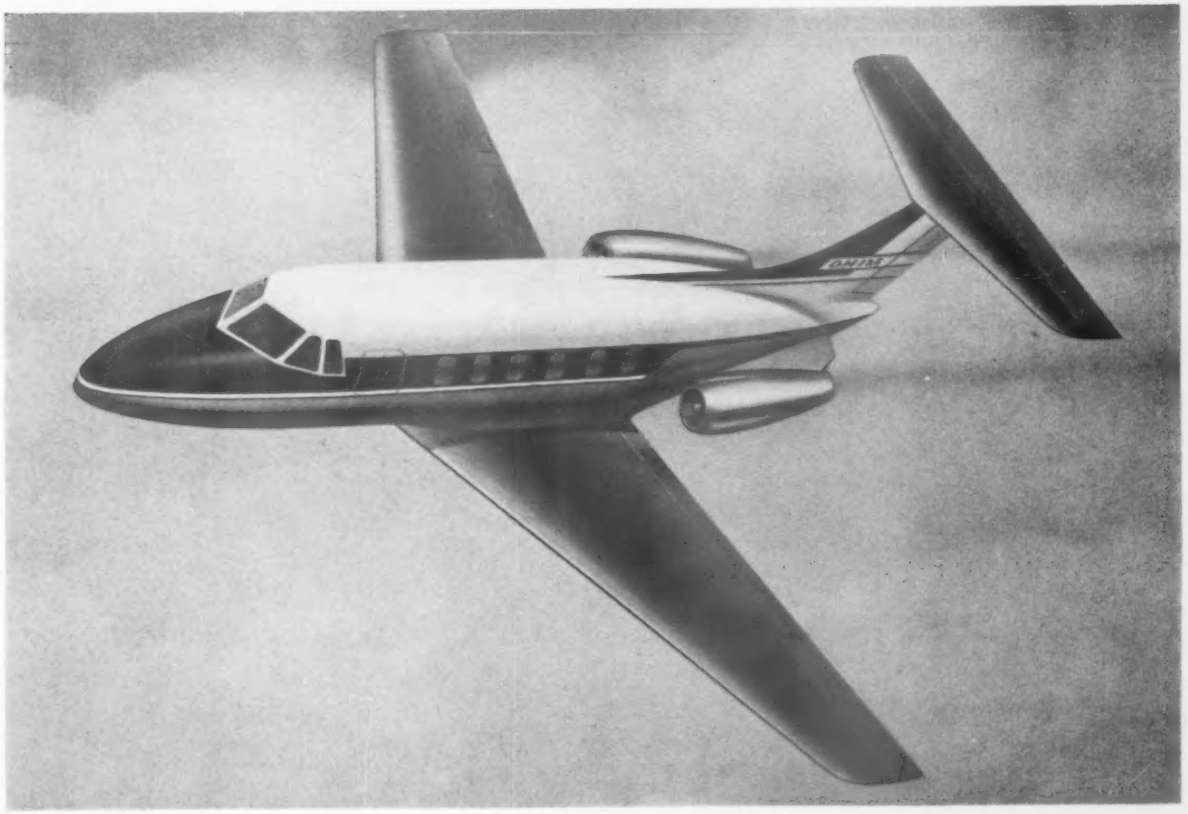
## EXECUTIVE AIRCRAFT

The Dove 8, favourite twin-engined executive.



The Heron, four-engined 'airliner-in-miniature'.

## IN THE LEAD TODAY



## AND TOMORROW

The New DH.125 500-mile-an-hour jet executive aircraft for delivery from 1963. (Bristol Siddeley Viper-20 engines of 3000 lb. ST). Backed by great engineering resources and unrivalled world-wide distribution and after-sales service.

**HAWKER SIDDELEY AVIATION** 32 Duke Street, London S.W.1

# David Owen buys a four-seater

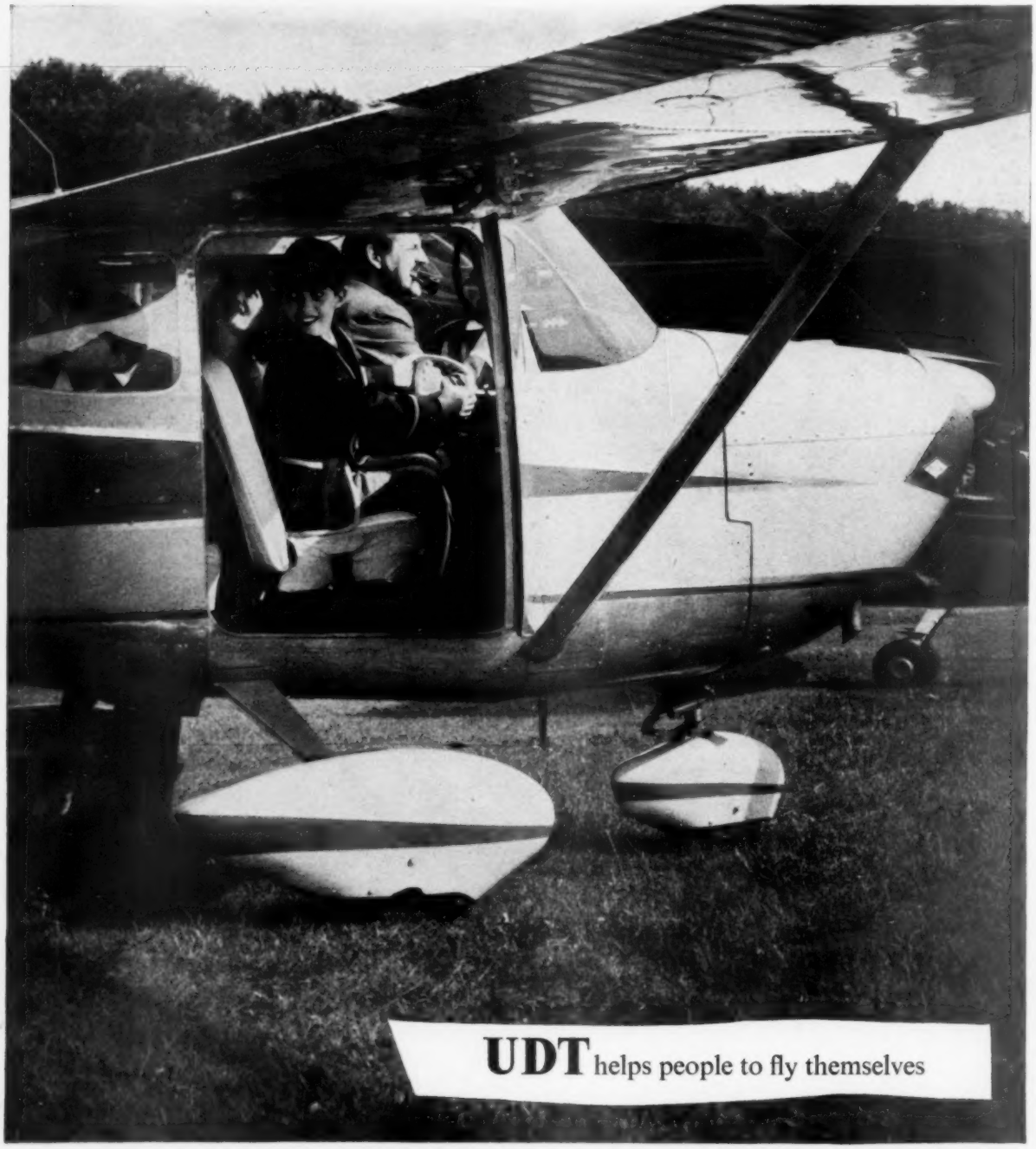
*(with a little advice from Dad)*

What's the use of a pilot father if he hasn't a plane to pilot? True, Dad's old plane was a Lancaster, a shade bigger than this . . . but David's quite prepared to settle for this neat tourer.

So from now on, all Europe's at the feet of the Owen family—fishing in Scotland or racing at Le Mans, week-end trips and holidays wherever they choose. And all at a cost not so very much more than a good motor car.

With UDT to finance him, David's father can pay for the aircraft over the months out of income, leaving his capital intact—a really practicable proposition.

Whether you're buying for business or pleasure—executive aircraft, family tourer or club trainer—UDT will help pay for it. UDT will help, too, to finance training courses for the Private Pilots Licence. Any A.B.A.C. Member Club will give you full details.



**UDT** helps people to fly themselves

UNITED DOMINIONS TRUST (COMMERCIAL) LIMITED · UNITED DOMINIONS HOUSE · EASTCHEAP · LONDON EC3

# Mercury Booster Misbehaves

AMERICA'S first attempt to send an unmanned Mercury space-capsule into orbit was ended some 40 seconds after lift-off from Cape Canaveral on Apr. 25. Veering off course, the Atlas booster was destroyed by the range safety officer shortly after the capsule had made an emergency separation.

One reassuring aspect of an otherwise disappointing launching was the fact that the capsule appears to have behaved perfectly under the impulse of its tower-mounted escape rockets. It drifted down by parachute and was picked up from the sea by a U.S. Air Force helicopter which conveyed it to Canaveral for inspection. Later, Mr. Robert Gilruth, director of the Mercury programme, said: "We are confident that had a man been aboard the capsule he would have survived."

The test-launching itself had multiple objectives. First, it was intended to evaluate the ability of the Mercury tracking network to perform tracking, data-gathering and flight control functions. Second, it was to qualify the spacecraft structure and all systems which must function during orbit and re-entry. And third, it was planned to test the means of bringing the capsule to Earth within the prescribed recovery area, on this occasion, after it had completed a single orbit.

It had been the intention to launch the Mercury spacecraft over the Bermuda station of the tracking network on a true heading of about 70°. The planned orbital altitude was about 100 miles and the orbital velocity approximately 17,500 m.p.h. Estimated flight duration was about 110 minutes, re-entry being initiated some 90 minutes after launching as the capsule neared the end of its first orbit; the recovery area was to be 300 miles east of Bermuda.

An internal programmer in the Atlas controls the launching from lift-off until the moment when the two lateral boost engines separate—after 2½ minutes. Shortly after lift-off, the Atlas is turned by its programmer to the desired 70° heading. From the time when the boost engines separate until the Atlas sustainer engine is cut off, the flight path is controlled by the Atlas radio-inertial guidance system.

A few seconds after the boost engines drop away, a clamp ring holding the escape tower to the capsule is broken, and both the escape and jettison rockets are fired to separate the tower.

The Atlas sustainer continues to accelerate the capsule until a guidance command cuts off the engine when the predetermined orbital velocity is reached at the requisite height.

After thrust has decayed, the adaptor clamp, which secures the capsule to the Atlas nose, is released and the "posigrade" rockets separate the spacecraft from the booster. After a few seconds of rate damping, the capsule is rotated through 180° and then automatically responds to a retro-attitude command which places and holds it at an angle of 34° above the horizontal, with the blunt heat shield forward and up. An automatic attitude control system maintains the capsule in this position throughout its orbital flight.

Near the end of the first orbit a timer in the capsule, monitored by ground command, fires the retro-rockets in the centre of the heat shield to start the re-entry sequence. Attitude control during this critical part of the operation is provided by high-thrust jets controlled by the automatic stabilization system. Shortly afterwards, the retro-package is jettisoned and the capsule rotated to a re-entry attitude.

Astronaut's periscope designed by the Perkin-Elmer Corporation for the Mercury space-capsule. As well as providing a view of the Earth below through a unique 180° optical system, the periscope has various indices to provide the astronaut with navigational data. It can also indicate the capsule's attitude.

One of the seven American astronauts familiarizes himself with the instruments in the Mercury capsule simulator at Langley Field, Virginia. The periscope is mounted between the centre instrument panels.

When the capsule has descended to about 42,000 ft., a drogue chute is deployed and at about 10,000 ft. the antenna fairing is jettisoned, thereby deploying the main parachute which lowers the vehicle for landing at about 20 m.p.h. Helicopters serve for recovery.

Special tracking stations established in Bermuda, the Canary Islands, in Africa, in Australia, on Canton Island, and in Mexico—in addition to a ship in the Atlantic Ocean and several stations within the continental United States—monitor the flight path. Trajectory computations are made by NASA's Space Computing Center at the Goddard Space Flight Center in Washington, D.C.

### Dummy Astronaut

As in the case of the first Russian attempt to orbit and re-enter a spacecraft on May 15 last year, the Mercury capsule carried an "artificial astronaut." The American device takes the form of a "box" containing apparatus allowing it to "breathe, sweat and talk in realistic fashion." (What it said during the enforced separation is not recorded!)

The astronaut simulator is designed to place the same loads upon the environmental control systems of the Mercury capsule as would a man. The simulator removes oxygen and adds carbon dioxide and water vapour to the recirculating oxygen stream and, in effect, duplicates the circulatory and respiratory functions of the actual astronaut. Body heat is simulated by electrical heating elements which can contribute 200 W.

Two playback tape recorders, each with pre-recorded voice messages of 45 minutes duration, provide an evaluation of the communication system. The messages by-pass the microphone and are radioed to ground stations over the spacecraft's transmitters. Systems to be used in future manned missions aboard the MA-3 capsule included communications, stabilization and control, reaction control (automatic, non-manual), environmental control, and electrical power.

Data on the performance of the capsule, its systems and equipment, and the sequence of its operation, were being telemetered to ground stations over four channels on each of the two telemeter links, each transmitting the same information.

The Atlas launching vehicle was equipped with an Abort-Sensing and Implementation System (ASIS) designed to send a signal to the capsule indicating an impending failure. Receipt of this emergency signal in the capsule immediately causes its separation from the booster.

Failure of the Mercury-Atlas launching will not delay the short-range ballistic test this week by an American astronaut. The booster on this occasion was to be a modified Redstone designed to loft the manned capsule to a height of about 115 miles with recovery some 290 miles down the Atlantic Range. The three men short-listed for this mission—John Glenn, Virgil Grissom and Alan Shepard—watched the Atlas misbehave. It is to be hoped that their confidence in the Mercury recovery system was increased as a result.

# The Beagle-Auster Airedale

MAKING its debut at the Shackelton Sales Weekend at Baginton on April 28, the new Beagle-Auster Airedale (one 180 b.h.p. Lycoming) introduces a welcome sign of the new thinking that has come to exist in the British light aircraft industry. While, as yet, this wind of change has not, perhaps, reached gale force, at least it is a strong and refreshing breeze. And as an indication of new things to come the Airedale has much to commend it.

Admittedly, this attractive little four-seater should only be regarded as an interim type extrapolated from a well-developed line. Nevertheless it *is* a new design and not simply the usual hasty stretch of an existing type. As such, therefore, this is an aeroplane that will be subjected, in the coming months, to the closest scrutiny by very critical eyes. It is early days as yet to forecast what the result will be, but certainly the indications are that the Airedale will measure up most satisfactorily to all the examination it will get.

A range of 1,000 miles at a cruising speed of around 140 m.p.h., with four seats occupied, is an attractive enough proposition in a vehicle costing less than £5,000. Couple this with good looks and an " executive " interior to which a great deal of thought has been given and the ensemble promises much.

Moreover, it is one that has a considerable potential " stretch " which could be realized with the later installation of the more powerful Continental powerplants to be produced in this country by Rolls-Royce. This, together with a certain amount of further cleaning up—a single bracing strut, for example, instead of the present V-struts—would seem to offer a long production life for the type.

As we have already said, the Airedale is to all intents and purposes a new design and the team at Rearsby are to be congratulated on the remarkably short time in which they have achieved it. Work on the project started towards the end of last year and the first flight of the prototype was made on April 16—a mere four months later. This has obviously meant a tremendous effort on the part of a small group and is one of which they have every reason to be proud. No doubt the enthusiasm of Mr. Peter Masefield, the Beagle Group's energetic managing director, played an important part in the short time-scale.

When it was first decided to produce a new small aircraft for executive use, the initial proposal was that it should be a fairly simple modification of the Auster D.6 with a nose-wheel undercarriage. Soon after this project was initiated, however, it became clear that the only satisfactory answer would be a new type altogether. Even so, Auster experience and practice has been heavily drawn on for the basic Airedale airframe; and, inevitably, the description which follows relates much of the new layout to the D.6 from which basically it has sprung.

In effect, the standard Auster D.6-type fuselage has been widened by 4 in. and the cabin portion lengthened in order to provide the necessary spaciousness for a four-seat executive layout. At the same time the rear fuselage has been lengthened so as to move the tail surfaces farther aft and provide a much needed increase in tail moment arm.

Not unnaturally, as this was to be the first in the new Beagle-Auster range, it was considered well worth while to create a characteristic " line " with a new fin and rudder shape—which after all is the most distinctive part of any airframe. The vertical tail surface, therefore, now follows the modern trend of being angular and swept; but the chosen lines are well balanced and the effect is most acceptable aesthetically.

Aerodynamically, the adoption of this particular Beagle " trade mark " has meant an increase in effective aspect ratio—2.01 compared with 1.5—and, in consequence, improved efficiency. It has been accompanied by a considerable cleaning up of the tail end of the airframe—including the use of a cantilever tailplane in place of the earlier wire-braced type. The new fin also gives aerodynamic advantages in added tail arm.

Another noticeable improvement in the new tail unit is that the surfaces are of aerofoil section instead of the flat slab-sided sections used in the earlier Austers. In planform the tailplane is now a straight tapered unit and has a trim tab on each elevator.

There have been no corresponding major innovations so far as the mainplane is concerned; this is still simple and straightforward with a parallel-chord planform and no pretensions in the way of taper. It is, however, squared off with moulded glass-fibre tips and, in this respect, departs from the normal Auster practice of rounded tips.

The aerofoil section remains unchanged as N.A.C.A. 23012 but the dihedral has been increased from 1° to 2° to give a general improvement in lateral stability. A 1° 15′ washout from root to tip makes certain that the stall is quite innocuous without any great tendency to wing dropping.

The wing follows Auster practice, too, in being braced; and for the main lift struts the well-tried V-type has been retained. For the Airedale, however, the lower end of the strut unit has been swept forward to pick up at the bottom of the front door post instead of at the rear one, thus greatly facilitating entry to the cabin. Close attention has been paid to fairing off these struts and particularly noticeable are generous fairing " bullets " over the jury-strut/main-strut junctions.

Each wing contains a fuel tank in its inboard portion giving a total standard fuel capacity of 32 Imp. gal. In the outboard portion of each wing, however, there is room for an extra 10-gal. tank so that the total maximum fuel capacity can be 52 Imp. gal.—all contained within the wing.

In order to improve the slow-speed end of the performance

range and ensure a good take-off, slotted flaps have been incorporated. Tests have established that in the take-off position these give an improvement in rate of climb of some 60-80 ft./min. compared with the split flaps used on the Auster D.6. And, of course, another welcome feature of the slotted flaps is that they also have much lower operating loads—of the order of 50% less it is said.

One part of the general aerodynamic cleaning up and refinement that is particularly evident on the Airedale is the distinctive ejector exhaust system. In this the exhaust gases induce a cooling air flow through the engine which makes for greater efficiency and less cooling drag. In fact, the engine can be run full throttle on the ground for comparatively long periods with the cylinder head temperatures still within the acceptable limits.

This ejector exhaust also permits a somewhat cleaner fairing of the exhaust system and of the carburetter air intake. The net result is said to be in the region of a three-knot speed "bonus."

Nevertheless, the prominent chin fairing, ending in a large-diameter pipe, does little to enhance the otherwise pleasant overall profile of the craft. Perhaps this necessary feature will itself ultimately be treated to a little styling.

Quite apart from its aerodynamic benefits—but equally important—is that this system has taken all the crackle and sharp noise out of the exhaust. Indeed, watching the prototype being put through its paces at Rearsby before it went to Baginton last week, one was most impressed by its pleasantly low and quiet exhaust note.

A nose-wheel undercarriage is, of course, a *sine qua non* for any new aircraft in this particular category. Here the Auster team were able to draw on some valuable first-hand past experience with their Atlantic project (which was seen at the 1957 S.B.A.C. Show). Although that earlier venture has played no part in the development of the Airedale it has served in offering some useful lessons in nose-wheel undercarriage layout for small high-wing aeroplanes.

The short wheelbase and high centre of gravity position inherent in a high-wing aircraft lead to pitching problems and these need careful attention in respect of control and damping. Furthermore, the high-wing layout proves rather more inflexible so far as main-wheel track is concerned. In the case of the Airedale these problems appear to have been satisfactorily overcome and to the onlooker, at any rate, the aircraft gives every impression of being steady and stable on the ground.

The spats selected for the Airedale have been carefully chosen after detailed wind-tunnel investigation. The result is certainly attractive and although at first sight the mainwheel units appear to be unnecessarily bulky, they have been designed to enclose the strut ends and thereby reduce the interference drag—which can be considerable in such an undercarriage layout.

**DESIGN DATA**

**Dimensions.**—Span, 36 ft. 0 in.; length, 26 ft. 4 in.; height, 9 ft. 3 in.; wing area, 184.5 sq. ft.; track, 6 ft.

**Weights.**—Empty, 1,630 lb.; disposable load, 1,120 lb.; max. fuel (52 gal.), 375 lb.; normal fuel (32 gal.), 231 lb.; pilot, passengers and baggage, 750 lb.; max. all-up, 2,750 lb.

**Performance.**—Max. speed (at sea level), 148 m.p.h. TAS; max. continuous cruise (at 5,000 ft.), 141 m.p.h. TAS; economic weak mixture cruise (at 7,500 ft.), 135 m.p.h. TAS; fuel consumption at economic cruise, 6¼ gal./hr.; range with normal payload, 650 miles; max. range, 1,050 miles; stalling speed (flaps down), 52 m.p.h.; initial rate of climb, 730 ft./min.; take-off distance to 50 ft., 595 yd.; service ceiling, 14,900 ft.

**Executive Interior**

It is, of course, in the cabin that the greatest interest will be for potential operators. Here a great deal of careful thought has gone into making sure that the final effect is "right." This has been achieved by a nice combination of layout and styling—the result of which is a most attractive limousine-type interior very much in the American small aircraft tradition.

The instrument panel has been specially designed to conform to the latest international standards of layout and presentation. It has been kept well forward to give as much room as possible for the occupants of the front seats and to be in the correct place for visual comfort.

A blind-flying panel is located in front of the pilot; all the engine instruments are grouped in the centre of the panel; and all radio controls and indicators are on the starboard side. In the prototype, incidentally, radio aids fitted include VHF, VOR, ILS indicator, and fan marker receiver.

Beneath the main panel and on each side of the central throttle box are sub-panels carrying electrical switches; engine priming, cabin heat and carburetter heat controls; two fuel tank gauges; radio circuit breakers; and a vacuum gauge for the gyro instruments. The throttle, mixture and propeller controls are now lever units instead of the push-pull knobs used in the earlier Austers.

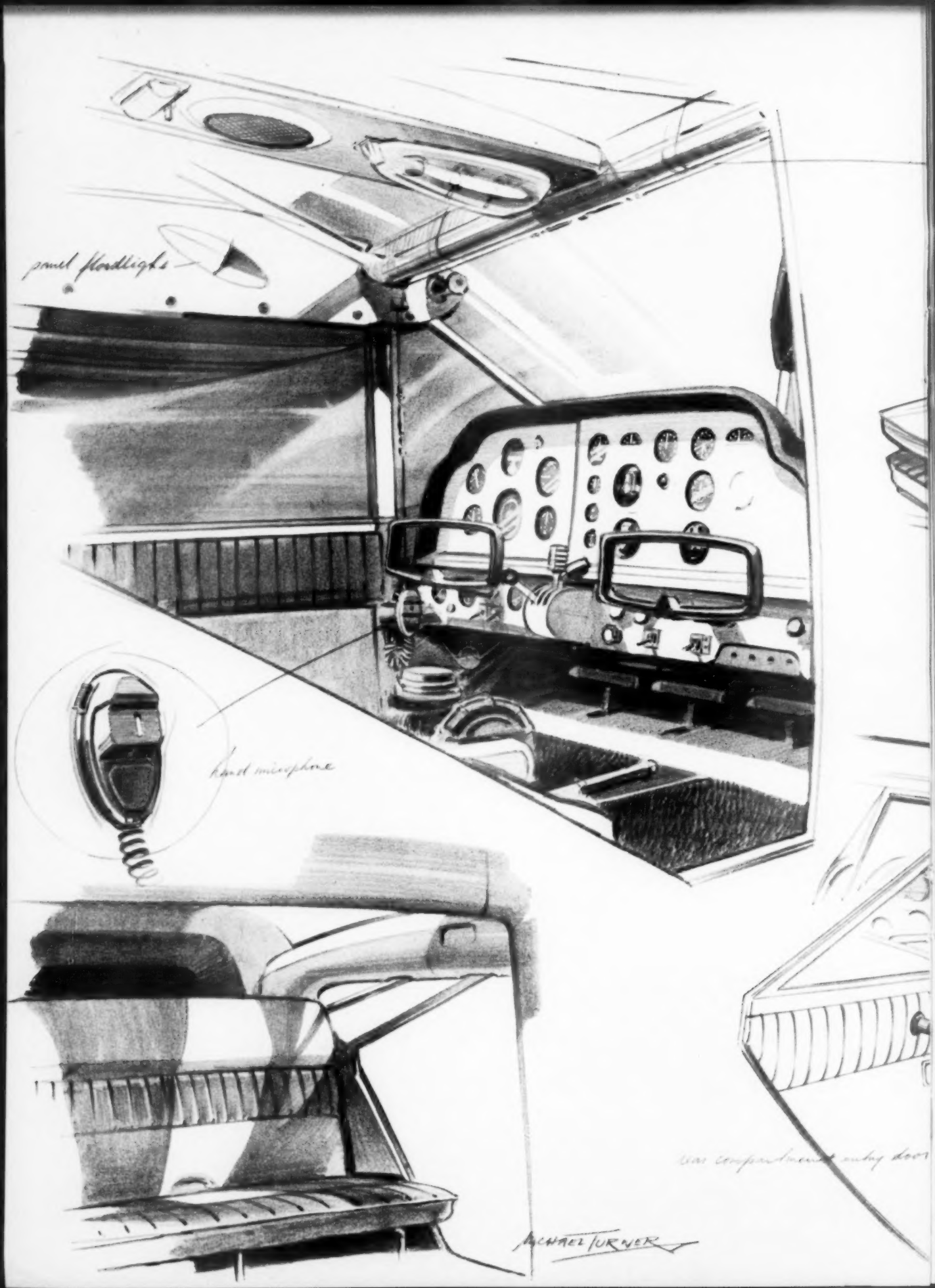
Engine starting is controlled from a centrally mounted roof panel, a useful feature that is usually confined to much larger craft. From front to rear on this panel there is a master switch, a generator field switch, magneto switch, and starter button. All these are covered by a single hinged Perspex panel to prevent inadvertent operation.

To the rear of the starter button in the roof is a loudspeaker and aft of that the cabin roof light. In the prototype Airedale two radio systems are provided—a loudspeaker used in conjunction with a hand microphone, and a head set with boom microphone.

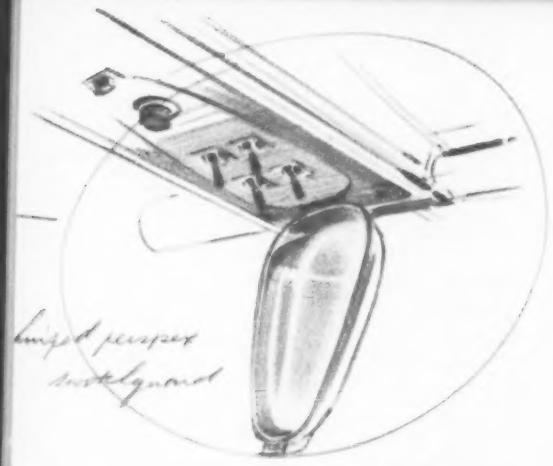
The front seats are adjustable by 4 in. fore and aft, and are on inclined seat rails so that as they move forward they rise up. Both the front seat backs can be folded forward. The

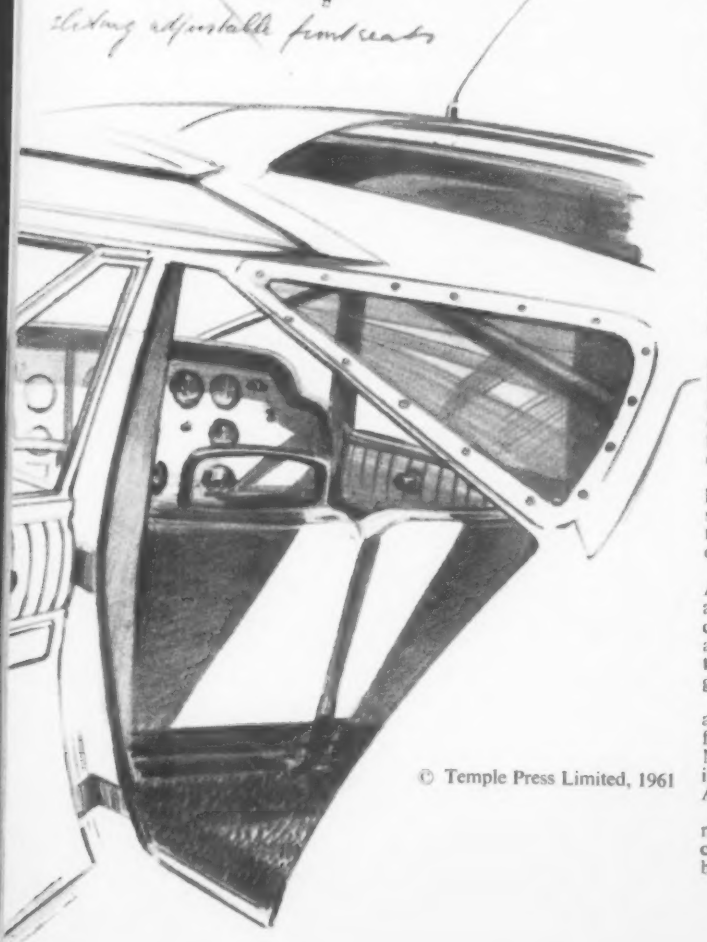
The sleek profile of the new Beagle-Auster Airedale is well brought out in this photograph; note the large ejector exhaust under the nose.

*Photographs copyright "The Aeroplane and Astronautics"*


panel floodlights
hand microphone
MICHAEL TURNER

## INSIDE THE AIREDALE: By careful attention to styling and layout, the new Beagle-Auster four-seater has been given, as these sketches by Michael Turner show, a commendably spacious and pleasantly comfortable "executive" interior.





© Temple Press Limited, 1961

rear seat is of the bench type with a deep headrest behind which is stowage space for hand luggage and hats.

The luggage compartment proper is behind the cabin with an external loading door on the starboard side of the fuselage. This compartment is designed to take up to 100 lb. of luggage and is equipped with a light which automatically goes on when the door is opened.

This "courtesy light" system is also provided in the main cabin. This has a forward door on the starboard side for access to the front seats and a rear door on the port side for the rear passengers.

So far as the flying controls are concerned, the pilots' handwheels are neat and unobtrusive. Rudder pedals are connected through push-pull rods to the nosewheel which can be turned 20° each side of centre. The elevator trim wheel is placed centrally in front of the seats: one turn gives the complete trim range. The slotted flaps are operated by a lever placed centrally between the seats; and the hydraulic wheel brakes are operated from a lever mounted centrally underneath the throttle box.

As we have already said the Airedale's airframe is largely based on standard Auster practice but wherever possible refinements and improvements have been made. Thus the fuselage is the normal welded steel tube type of structure but has metal stringers instead of the earlier wooden units. Pressed light-alloy formers are used to give the required roundness to the cross sectional shape and to these are attached "witches-hat" light-alloy stringers. Along the fuselage side, however, the single stringer is an oval-section tube.

A very worthwhile improvement is that the fuselage back to the luggage bay is now metal skinned and only the rear fuselage is fabric covered. At present the tail cone is metal but in future aircraft this will be a glass-fibre unit.

The cabin doors are made up of sheet metal with a formed inner pressing spot-welded to the outer skin panel, rather on the lines of a car door. This, it is claimed, gives a lighter as well as a more rigid unit.

For the wing structure, the Rearsby team have departed from past British practice and have followed an American design trend in choosing to have light-alloy extruded I-section members forming the two main spars. These units are lighter than built-up members and are reckoned to be very much cheaper. Wing ribs are built-up in a similar fashion to those of the Auster and drag bracing is provided by wire-braced rectangular tubes. In the tank bay, however, the drag bracing is provided by a diagonal strut which passes through a "tunnel" welded into the tank. Another refinement in the new wing is the use of light-alloy attachment fittings at the root and strut positions instead of steel units.

Ailerons and flaps are orthodox structures with pressed ribs, pressed channel spars and a torsion-box nose. The aerofoil section of these two surfaces is the same, and common ribs can, therefore, be used.

The swept fin is a normal two-spar structure with tapered pressed channel spars and pressed ribs. It has a metal skin between the spars and the leading-edge and dorsal fairing form a one-piece glass-fibre moulding. Fin attachment is by means of a two-bolt pick-up to the rear spar and a pin joint at the front spar. The rudder is hung on two hinges and is fabric covered over pressed spars and ribs.

The tailplane is a one-piece unit with two spars. In this case, however, the inter-spar skin is stabilized by Redux-bonded stiffeners and there are no ribs other than those at the root and tip positions. The elevators are similar to the rudder and are each carried on three hinges.

Finally, it is interesting to record that the structure of the Airedale has been designed to the American CAR3 requirements as well as to BCARs. In certain respects the U.S. stressing cases are more stringent than British ones for light aeroplanes and the net result should be an airframe that is rugged enough to stand up to plenty of hard treatment in the air and on the ground.

In such a brief appraisal it has not been possible to deal at any length with the many interesting structural and mechanical features of this newcomer to the range of British light aircraft. Nor at this stage is it possible to present any close analysis of its performance in relation to its competitors from across the Atlantic.

Nevertheless the facts and figures which have so far been made available suggest that it should be able to compete quite competently. No doubt this will be reflected in a healthy order book in the very near future.—F. T. MEACOCK.

*Executive and Personal Aircraft . . .*

# Light Aviation in Australia Today

by D. J. Hill

AUSTRALIA is undoubtedly one country that is made for the light aeroplane. Distances are great, which creates the need for all forms of quick transportation, and flying weather, while it can be very bad, is generally very good. Although sport flying is booming as never before, many Australians take to the skies for reasons of pure necessity. The industry, therefore, has a good solid foundation, and does not cater purely for a market that flies for fun.

As in many countries at the end of the War, all sorts of predictions were made as to the future of aircraft, and particularly the helicopter. As elsewhere, the immediate post-War boom burst, and light aviation remained in the doldrums for some years. Even so, a significantly large number of various types of Auster aircraft were sold in this period, and the type won a large circle of friends as the mainstay of post-War flying. Most clubs used the ubiquitous Tiger which became available from Government disposal sources, but the Auster was the first new production aeroplane to be purchased in any quantity.

Less than five years ago a company came into existence which has played a leading rôle in the light aircraft boom which is currently under way. Rex Aviation Pty., Ltd., was formed as a subsidiary of a New Zealand company, with the object of marketing Cessna aircraft in Australia. Offices were rented in a hangar at Bankstown, Sydney's light aircraft field, and the one-man sales team began the introduction of a modern aircraft to Australia. Sales were severely curtailed by import restrictions, as only very essential users were granted import licences, but the company became increasingly aware of the future of light aviation in the country. As licensing gradually eased, the company put up their own hangar and offices to cater for the steadily increasing sales of Cessnas. Some idea of their success can be gained from the fact that in 1960 the company delivered no fewer than 110 Cessna aeroplanes of all models.

Of course it has not just been a Cessna success story. The Piper organization have been very active too, and although their results have not been so spectacular they have nevertheless sold many Piper aircraft and have created a wide circle of followers. The Tri-Pacer in its various versions has been widely used by clubs and private owners, and its successor, the Cherokee, is certain of a good reception.

Beechcraft have only recently begun to make their presence felt. In 1959 the distributorship was awarded to de Havilland Aircraft Pty., Ltd., and they have proceeded to market the product with vigour. Although their sales are not numerically nearly as great as those of Piper or Cessna, the amount of business being written is healthy and they are most decidedly a force with which to be reckoned.

More recently various Continental aircraft have arrived in Australia, due to a concerted sales drive by their various Australian representatives. These types include the Piaggio 166, Meta-Sokol and Aero 145, and their capabilities in the demanding Australian climate are being watched with interest.

The competition between the various distributors and agents for these and other types of aircraft has had a most favourable effect on the industry. The selling campaigns place a great emphasis on after-sales service, with the result that more and better maintenance facilities are constantly coming into existence. One of the leading distributors has a stock of spare parts that has to be seen to be believed, and they show visitors around their overhaul shops with justifiable pride. Their sales team delight in comparing a brand new engine with one that they have just overhauled. The chances are the uninitiated will choose as brand new an engine that may well have had its third or fourth overhaul. The client, and potential client, is very well looked after by all the distributors, and the effect is very beneficial to all concerned.

Attempts are being made to promote "air motels," so that aircraft owners can have something out of the ordinary to do at week-ends, and avoid the inevitable traffic congestion on the roads to the beaches. There is undoubtedly a big future for this type of facility.

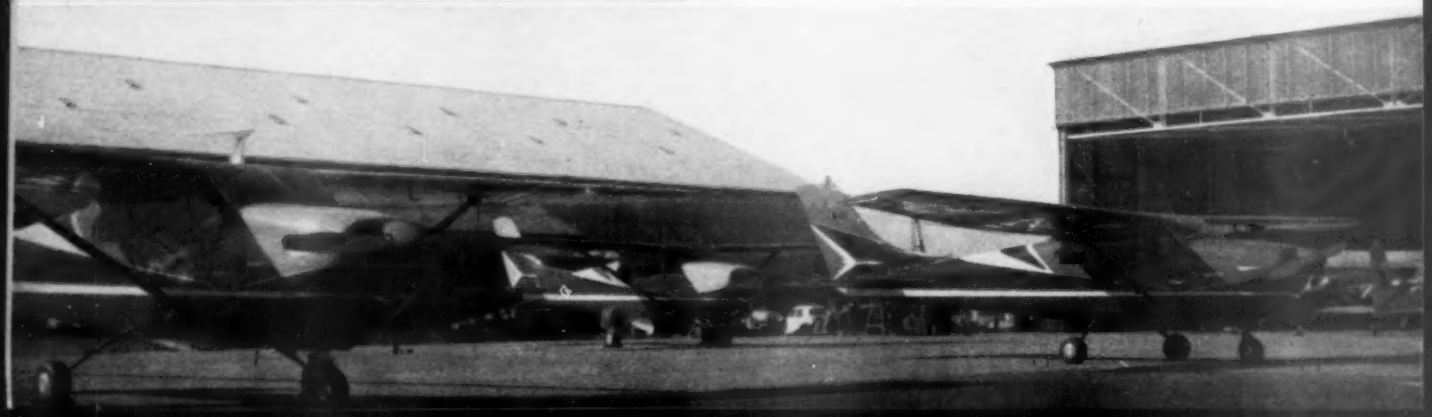
So far mention has only been made of imported aircraft. What of Australia's own production industry? As in other parts of the World, the Australian aircraft industry has depended on military aircraft orders for its existence. It has shown itself capable of building aircraft such as the Vampire, Canberra and Sabre, and production of the Mirage III is soon to begin. Although most people have looked towards this industry with the expectancy that sooner or later an aircraft designed specifically for Australian conditions must emerge, so far they have been unrewarded. One of the leading companies had a design on the boards for a four-seat, high-wing, all-metal machine, roughly comparable with the Cessna 175,

(*Continued on page 487*)

Above, this Piper Aztec of W. E. James Air Charter Service at Bankstown, N.S.W., is a good revenue earner with its six-seat capability.

Left, a Lycoming-engined black and cream painted Auster at Sydney belonging to a leading woman pilot, Dr. Pat Rutherford.

Below, Cessna 210s outside Rex Aviation's Bankstown hangar.



# *For proven power*

# ROLLS-ROYCE

## AERO ENGINES

*for*

## *LIGHT AIRCRAFT*

Manufacturing facilities are now being established by Rolls-Royce to build light aircraft engines under licence from Continental Motors Corporation of the U.S.A.

Four and six cylinder piston engines, which have already proved themselves in thousands of hours of operation in North America and elsewhere, can be supplied now at powers ranging from 65 to 260 b.h.p.

Future models will extend the range up to 400 b.h.p.

*For full particulars write to:*

ROLLS-ROYCE LIMITED
LIGHT AIRCRAFT ENGINE DEPARTMENT
CREWE

ROLLS-ROYCE—AERO ENGINES · MOTOR CARS · DIESEL AND PETROL ENGINES · ROCKET MOTORS · NUCLEAR PROPULSION

**MR. J. C. BAMFORD,** Chairman and Managing Director of J. C. Bamford (Excavators) Ltd says:

"We fitted Decca because we operate into many small, ill-equipped airfields all over Europe and we must be able to fly in any weather day or night, with the same regularity as from any major airfield".

Cockpit of the de Havilland Dove 8 owned by J. C. Bamford (Excavators) Ltd., showing the Decca Flight Log and Decometers. The installation consists of a Decca Mark 8 Receiver (½ ATR) and Computor (½ ATR), Flight Log and Receiver control boxes and display head, the total weight of all units being less than 45 lbs.

**THE DE HAVILLAND AIRCRAFT CO. LTD.,**
suppliers of the DOVE 8 aircraft, state:

"Decca is a proven system for the operator of executive aircraft such as the de Havilland Dove 8 who must frequently navigate away from airways and use airfields where approach facilities are often non-existent".

# THE DECCA NAVIGATOR

## for executive aircraft

THE DECCA NAVIGATOR COMPANY LIMITED LONDON

(*Continued from page 486*)

which many people believed would have been extremely saleable. Because of the usual gamble of mass-producing anything, it was dropped and the company diversified its activities into the non-aviation field.

Although some more modest companies flirted with the production of aircraft, they did not get far. Most notable of these was the Fawcett 120, quite a sensible four-seater, which put in quite a number of flying hours before being pushed into the back of a hangar to gather dust.

Many questions remain to be answered, but it looks as if a company quite outside the aviation industry will take the initiative on light aircraft production in Australia. That company is Victa Consolidated Industries Pty. Ltd., who achieved fame by making rotary-type power lawn mowers. A brand-new company such a short time ago, Victa have always believed in using modern methods to market a modern product. Their slogan—"Turn grass into lawn with a Victa"—is indicative of their sales approach. Their factory is just five minutes' drive from Bankstown aerodrome, so it was natural that they purchased an aircraft to transport their excutives around a far-flung sales territory. It was also natural, if somewhat unusual, for Victa's founder and managing director to use a Skimmer amphibian for commuting between factory and his Palm Beach home. Their interest in aviation just had to happen.

Slowly but surely Victa seem to be proving their critics wrong. Their first design, the R-2, had its maiden flight in February. It is a low-wing four-seater of all-metal construction, powered by the well-respected Lycoming O-360 of 180 h.p. driving a constant-speed propeller. A high performance is claimed, and its development is being watched with interest by all concerned—particularly the distributors of comparable products from abroad. Victa have also undertaken to produce a light two-seater, the Air Tourer, as a club machine. This aircraft in its wooden prototype form has been flying for some time now, and is gradually winning its supporters. In its production form it will be all metal, as wooden aircraft are virtually unsaleable in Australia today. Victa are making production promises which are quite ambitious, to counteract the threat of the Morane Rallye, and production of much of the aircraft will be sub-contracted to achieve this. Letters-of-intent have been received for both the R-2 and the Air Tourer from both Australian and New Zealand sources, and Victa will promote them vigorously in the whole Pacific area. It is without doubt the most interesting and promising development in the local aircraft industry.

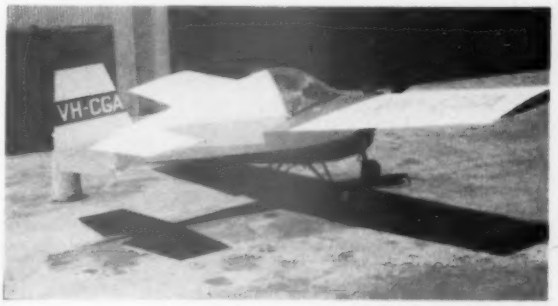
Victa are not alone in their faith in the market for light aircraft in Australasia. Representatives from the Cessna Aircraft Company, including a vice-president, have had a good look around the Australian production potential and are believed to be giving serious consideration to building Cessnas there.

Who constitute the market for light aircraft in Australia? So far, the majority of private owners have been graziers. To them, the aeroplane is a very valuable station implement, just as is a tractor or a Land-Rover. It enables them to get to town quickly and comfortably, with all that that entails in the way of security and convenience. Distant wool or cattle sales—and race meetings—come easily within their reach. They can reconnoitre their properties in a matter of minutes to locate their mobs of cattle or sheep, which by other means may take hours—or sometimes even days. A recent purchaser of a Cessna 182 insisted that plastic covers be fitted to the seats and the sides of the rear compartment of his new aircraft, so that his dogs would not spoil the upholstery. Like quite a number of others he uses his aeroplane to round up his sheep, then lands in the paddock and puts out his dogs to keep them there until he comes out to fetch them by more conventional means—a motor bike.

Aero clubs and flying schools provide probably the second greatest segment of the market. The Tiger Moths were almost completely replaced when ex-Royal Air Force Chipmunks became available at reasonable prices, and more recently the clubs have introduced Pipers and Cessnas. Although their capital cost is greater than previous types, their reliability and generally lower direct operating costs have enabled high utilizations to be achieved. Their comfort has attracted a new type of student to the schools—the older person who is generally more solvent than the enthusiast and who is interested in flying purely as a means of getting from A to B. Generally he has no interest in aerobatics, and having to dress for the part of the traditional aviator would be a deterrent to him. He is not particularly worried about the nicety of the ailerons or the elevators, but the engine must always start at the touch of the button as well as convey him quickly and comfortably to his destination.

These are also the needs of the average businessman. The availability of modern American executive aircraft is having an impact on Australian business, although aircraft are not yet selling in large numbers purely for this purpose. The aircraft distributors, however, are quite confident that this constitutes the biggest future market for light aircraft in Australia, and are spending comparatively large sums on promotion campaigns. As in present-day England, it is largely a question of educating business houses to the advantages that their own aircraft can offer.

A Cessna 180 of Australian Army Aviation Corps. The overall khaki paint scheme contrasts with that sported by civilian Cessnas, but the aircraft retain their comfortable interiors.




Ultra-light aircraft have quite an enthusiastic following in Australia. This is the first Tipsy Nipper to be imported.

Quite a large number of modern light aircraft are used by the many charter operators and bush airlines that have come into existence since the War. Most operators use fleets of Cessnas or Pipers, although the ideal aircraft for many of them is not yet available. Generally they want a fast, comfortable six-seater, with appropriate baggage capacity, easily convertible from carrying passengers to freight. And they must have it at a reasonable price. It is conceivable that the LASA 60 Azcarate or the Cessna 185 Skywagon will meet this requirement.

A number of government departments use aircraft for a variety of purposes. Probably the most well known of these is the Commonwealth Scientific and Industrial Research Organization, who use two Cessna 310Bs for rain-making experiments. Army Aviation use a fleet of Bell helicopters and Cessna 180s, and there appears to be a need for a light twin communication type for the armed forces.

Light aircraft are also used in numbers for all agricultural purposes. Most favoured for crop dusting and spraying are the Beaver, Cessna 180 and Tiger Moth, while examples of the E.P.9, Fletcher FU-24, and Piper Pawnee and Super Cub are also to be seen. Home-grown aircraft include the Commonwealth Aircraft Ceres and the Yeoman Cropmaster, while two E.P.9s have been converted at Bankstown to take Cheetah engines.

So far, little mention has been made of English light aircraft, and the reason is simply that they play very little part in the current light aircraft boom in Australia. Some years ago, Auster announced their Atlantic model, which could perhaps critically be described as a Tri-Pacerized Auster. Nevertheless, a number of firm orders for the type were placed with Auster agents, but it never materialized. That people were prepared to place deposits for a new product, sight unseen, is indicative of the regard that many people have for the Auster design. Although many of them have since been won over by the sheer excellence of the American product, the BEAGLE-Auster is bound to create a great deal of interest. Whether that interest will result in orders being placed is up to BEAGLE. The Australian market is no longer one hungry for any type of light aeroplane. A wide choice confronts the would-be purchaser. The market is now more sophisticated, and people are used to a good, reliable, comfortable product, slick salesmanship, and excellent after-sales service.

If BEAGLE can match those requirements—or better them—then a goodly share of the potentially lucrative Australian market is theirs. Many old friends await them, and who could hope for a better start than that?

*Executive and Personal Aircraft . . . .*

# Air Space for Everyone

*"There is room in the air over the British Isles" writes* PETER MASEFIELD, M.A. (Eng.), F.R.Ae.S., M.Inst.T., Hon. F.I.A.S., *"for everyone with safety. A new philosophy is needed so that pilots of all types of aircraft can fly in harmony together."*

MUCH "highfalutin'" debate has been going on, of late, about regulations in the air. So much so, in fact, that—although it is appropriate for scheduled traffic in upper air space—there is a danger that many would-be amateur aviators in the lower strata will be frightened off, while some "old-time" professionals are getting increasingly worried about being able to cope.

Let me say, therefore, right away—that flying over the British Isles today is neither difficult nor dangerous. In general, the air is not, even remotely, congested and air traffic controllers, as a body, are everywhere helpful and courteous. Having said that, however, one must add that there are disturbing indications of a trend towards a less satisfactory state of affairs, and a band of opinion is obvious, especially among a small section of airline pilots, that any air users other than scheduled transport aircraft are a menace. Indeed, topicality is given to a new version of the old "Fougasse" cartoon, where the bus driver addresses the taxi-driver, the taxi-driver the private motorist, the private motorist the cyclist, and the cyclist the pedestrian—and each shouts to the other, down the scale, the same—"Get off the road!"

In fact, there IS room in the air for everyone—and SAFELY.

But what is wanted today is a new, broad philosophy towards the increasing use of the 1½ million cubic miles of flyable air space over the British Isles—and especially towards use of the lower 250,000 cubic miles of that total. We need a philosophy which will make possible the maximum development of all aspects of aviation so that all can fly in safety and harmony together.

This, I am sure, can be done.

There are in the air today six quite different breeds of users—all with, legitimately, different requirements. They are:—

1. **The professional airline pilot**—with a responsibility for up to 200 paying passengers behind him. He usually has at his elbow a full crew and every known radio and navigational aid. (Equipment costs up to about £50,000.)

2. **The professional business and charter pilot**—who is flying fully equipped aircraft and can meet all normal air traffic control requirements in all weathers. (Equipment costs between, say, £3,000 and £10,000.)

3. **The qualified military pilot**—whose experience and equipment are probably of the same order as many professional civil pilots.

4. **The professional business and charter pilot**—who is flying a less fully equipped aeroplane and so is capable of meeting most, but not all, normal air traffic control requirements. (Equipment costs up to, say, £3,000.)

5. **The skilled and experienced amateur pilot**—flying an aeroplane with much the same level of equipment as No. 4 above; and

6. **The less experienced amateur**—with minimum radio—or none. (Equipment costs up to, say, £500.)

The requirement is for a code, and a responsibility on the part of each of the six breeds, so that all can live happily in the air together—with the emphasis on "LIVE."

In the United States—where there are today some 4,000 commercial aircraft and some 70,000 other civil aircraft of "general aviation"—the basic, and democratic, philosophy is that "all men are equal"—whether they are alone in the sky or have 200 passengers behind them, and that—subject to certain minimum requirements—any pilot can use any airport at any time.

We here have laboured to be more conservative and less liberal. As a result, London Airport has, until recently, been banned to all but scheduled airliners, while a policy of "Permanent Instrument Flight Rules" has been clamped on to Control Zones. As a result, there is less genuine "freedom of the air" over the United Kingdom than over almost any other country in the West.

The new upsurge of "general aviation"—now gathering momentum—does, however, require a New Look if this upsurge is not to be throttled and restricted at its very beginning. At the same time, we must secure both safety and discipline in the air if we are to achieve a much greater acceptance of use of aviation than at present.

During recent months the Aviation Committee of the Royal Aero Club, together with the British Gliding Association and the newly formed Business Aircraft Users Association, have been discussing together the basis of such a New Look. And together with the Association of British Aero Clubs, the Guild of Air Pilots, the Guild of Air Traffic Control Officers, the two Corporations and the British Airline Pilots Association, they have been debating some of the inherent problems with the Ministry of Aviation in the Civil Aircraft Control Advisory Committee.

As yet it is too early to set down any positive results, but some specific pointers are worthy of mention.

The really important thing, at the basis of all air traffic control, is that areas of greatest density of traffic should receive major attention and that the path of aircraft at take-off and on approach shall be kept clear of any interruption. Further, the fact that modern high-speed jet aircraft cannot easily take avoiding action means that the old "see and be seen" principle of avoiding collision cannot readily be applied to them.

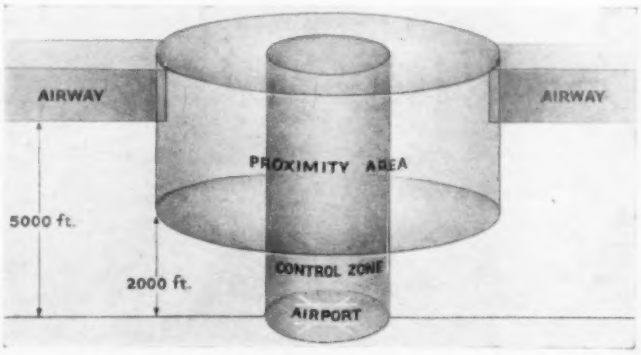
Hence the concept of the Control Zone around a busy airport. And hence, also, the concept of both the Transition, or Proximity, Area around a Control Zone and the designated Airways into which a Proximity Area can lead.

The real trouble, for all except the scheduled airlines, is that, because Control Zones and Transition Areas have grown so large and have acquired "Permanent IFR" within them, more or less restrictive barriers to all other forms of flying are being erected across the country around London, Manchester and the Edinburgh/Glasgow area.

A solution to all these problems might appear along the following lines, while maintaining the principle of full regulation and control over all scheduled flights:—

1. **Control Zones** should apply only to busy airports and should be limited strictly to the area around an airport necessary for modern airliners to climb to and descend from, say, 2,500 ft.

2. **Proximity, or Transition, Areas** should be set up, where necessary, around Control Zones to provide a further link of regulated air space between the Control Zones and Airways.




Control zone chimney with circular proximity area "mushroom."

Thus a Proximity Area could have a "floor" of, say, 2,000 ft. QNH, above which regulated air space would apply, but below which, up to the sides of the Control Zone, there would be free air space.

This concept would erect a series of "chimneys"—in the form of Control Zones—around busy airports. These "chimneys" would, most conveniently (for both navigation and radar), be circular with a radius equal to the normal distance which a modern airliner requires to reach 9,500 ft. They need not be so large that the most heavily laden, ancient, airliner would be covered, because such requirements are not frequent enough to justify so much sterilization of free air space. The oft-quoted example of: "A York, carrying an elephant, taking off down a 30-kt. wind with one dud engine" need not be legislated for—though it is at present.

Around the control zone "chimney" would be the circular, Proximity Area "mushroom," with free air space below its lobes—see illustration at foot of previous page.

At the edge of the Proximity Area the scheduled airliner would enter controlled airways at, say, 5,500 ft. The perimeter of the Proximity Area would thus have to be the distance from the airport which the average airliner requires to reach that height.

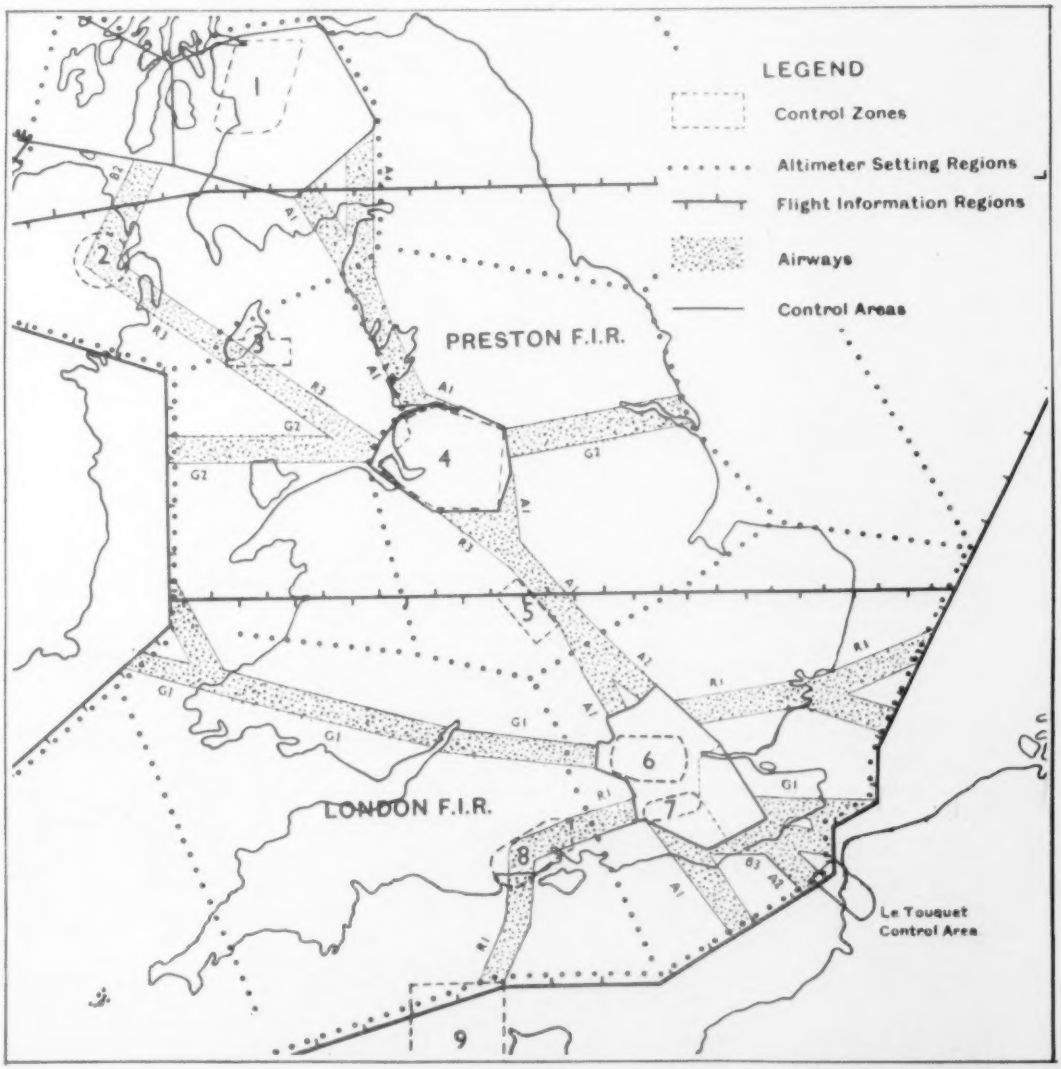
What such a scheme would achieve, simply, would be free air space up to 2,000 ft. under Proximity Areas and up to the edge of, much smaller but adequate, standard, circular control zones—which could be, perhaps, no more than 16 miles in diameter, centred on the relevant airport. There would be free air space up to 5,000 ft. everywhere under Airways. And outside the regulated areas—"Control Zones," "Proximity Areas" and "Airways"—there would be free air space anywhere at all heights. This would greatly assist freedom of air passage and the development of aviation generally. At the same time, with the right radio equipment, any aircraft would be able to gain permission to enter Control Zones and Proximity Areas.

There is a further point of importance here. The number of VHF radio frequencies required to fly, in full communication, everywhere in the U.K. today is so large that expensive multi-channel sets are necessary. Work is now going on, in co-operation with the Ministry, in an endeavour to work out a series of "Secondary frequencies" which will make possible widespread radio communication using much cheaper installations in aircraft, confined to a relatively few channels.

The problem of gliders—which today need to use air space up to remarkable heights—is also being worked upon. As Philip Wills cogently remarks, the problem of gliders is peculiar unto themselves—they can hear as well as see other aircraft, and there are few, if any, instances of collision between gliders and powered aircraft in upper air space.

All this has to be seen and judged against the undoubted fact that, within the next few years, business and private aircraft over the U.K. will outnumber scheduled transport aircraft by, perhaps, 10 to one. Sensible regulation where it is needed (which can be so framed that it is SEEN to be necessary by all those concerned, without being unnecessarily restrictive), combined with a sense of responsibility on the part of all those using the air, and a recognition on the part of all authorities of the need to help in the development and expansion of all aspects of aviation, are the foundations on which a bright and confident future can be planned.

I believe that such a future will be achieved in the air.




Control Zones.

1. Scottish.
2. Belfast.
3. Isle of Man.
4. Manchester.
5. Birmingham.
6. London.
7. Gatwick.
8. Southampton.
9. Channel Isles.

*Based on International Aeradio Chart.*

*Executive and Personal Aircraft . . . .*

# Light Aircraft Radio Aids

BOTH in the United States and in this country a wide range of airborne radio equipment and navigational aids is available for the privately owned light aircraft and for the more complex company-executive transport. A representative selection of this equipment, designed for installation in most types of aircraft where pilot operation is a major requirement, is described in these notes.

## BENDIX

For executive aircraft communications VHF combination provides 360-channel operation in the 118-135.95 Mc/s. frequency range. The TA-21A transmitter with crystals for 360 channels weighs 12 lb. and the RA-21A receiver with crystals for 560 channels weighs 7¼ lb. Both units are controlled from a common frequency selector.

The Bendix RA-21A/MNA-21A navigation system incorporates an RA-21A receiver, an MNA-21A navigation unit weighing 3.9 lb., a marker receiver, a glide-slope receiver and indicator. The system provides reception of localizer glide slope, Omni-range, marker and communications signals.

Minimum instrumentation provides vertical needle indication of position with respect to selected Omni-track or localizer beam. The glide slope receiver with 70 crystal - controlled channels presents vertical guidance information from the ILS on a horizontal needle on the deviation indicator. Total weight of the units is 21.3 lb.

The United Kingdom sales and service agents for Bendix International are Field Aircraft Services, Ltd., at London Airport.

## BURNDEPT

Two five-channel VHF transmitter-receivers—the Type BE.255 and the Type BE.256—are manufactured by Burndept, Ltd., of Erith, Kent. Both are crystal controlled on transmit and receive for operation in the 116-132 Mc/s. band.

The BE.255 comprises a combined transceiver unit containing transmitter, receiver and transistorized power supply; a connector kit, and control box.

When fitted to its mounting tray the transceiver weighs 8 lb. 2 oz. and the control box weighs 10 oz. The nominal effective range of the BE.255 is 50 miles at 3,000 ft. A complete installation, including 10 crystals and aerial, costs approximately £150.

The BE.256 is designed for installation in aircraft where the BE.255 is not suitable due to lack of accessibility. The basic equipment comprises two units—a transceiver and a remote control panel—and a complete installation normally weighs less than 15 lb. and costs £30-£40 more than the BE.255.

## COLLINS

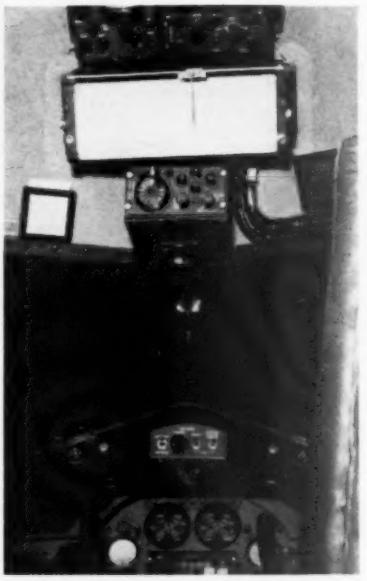
Two VHF comm./nav. systems from the range of airborne equipment made by Collins Radio Co., of Cedar Rapids, Iowa, have been produced for single-engine aircraft. The first, a "delux" system, comprises the 5IX-3 190-channel crystal-controlled receiver; two 17L-8A 90-channel crystal-controlled transmitters; the 5IX-3 VOR/localizer receiver; Omni converter-indicator, marker beacon and power supplies. The other differs from the "delux" system by the omission of the marker receiver and the second 90-channel transmitter. The complete 5IX-3/17L-8A communications system weighs 12¾ lb. and is priced at approximately $1,600 and the 5IX-3/344D-1 navigation system weighs 12.15 lb. and costs $2,264.

For light twin types, Collins again have two systems. Both employ the 618F-1 360 crystal-controlled channel transceiver, a standby 17L-8A transmitter and while the "delux" installation has VOR/ILS/ADF facilities and a gyro compass, the second system provides only VOR or VOR/ILS navigation and approach aids. The 618F-1 transceiver weighs 12.7 lb. and is priced at $2,100.

## DECCA

The Decca Navigator Co., Ltd., has designed its Mark 8 equipment for aircraft having airspeeds of not more than 240 knots. Fitted with Decometers and Flight Log, the system provides both meter and pictorial displays of aircraft position in relation to the Decca chain and the local terrain. The fractional scale of Decometers is stated to provide an accuracy of 0.01 lane, or 5 yd.

A complete installation engineered to ARINC specifications comprises three "black boxes"—receiver, computer and aerial amplifier—two control boxes, the Flight Log display lead and four Decometers. For S.B.A.C. racking the power supply is not incorporated in the receiver and forms a separate unit. Without racking and cables, the ARINC version weighs approximately 41 lb. and the S.B.A.C. racking model 81 lb.



The Flight Log display and control boxes of a Mk. 8 Decca Navigator installation in a D. H. Dove Eight.

## EKCO

Ekco Electronics, Ltd., are shortly introducing a lighter and smaller antenna scanner for their E.190 lightweight weather radar. This will reduce the overall system weight to 46 lb., including inter-connections, and make it suitable for installation in such types as the Aero Commander, Beechcraft Twin Bonanza and Super G18S, the Cessna 310 and Dove Mk. 8.

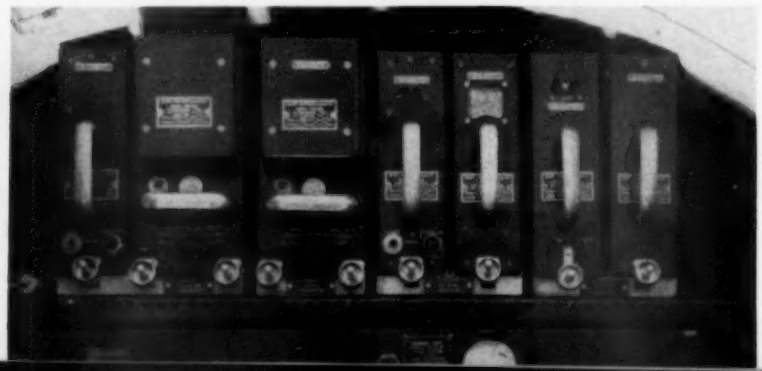
The standard E.190 equipment comprises three units—scanner transmitter/receiver and indicator—and weighs 57 lb. It has a maximum range of 150 miles and a high brightness display covering an azimuth sweep of 180°. Two intermediate range scales of 20 and 50 miles can be selected and the scanner is fully stabilized. It can be deflected for ground mapping and also tilted upwards to examine clouds above the altitude at which the aircraft is flying.

## ELLIOTT

Among transistorized radio equipment for executive and private aircraft are the Elliott 21 Series VHF communications and VOR/ILS navigation units. Manufactured by the Airborne Radar and Radio Division of Elliott Brothers (London), Ltd., the five components making up to the complete 21 Series system have a total weight of 47½ lb.

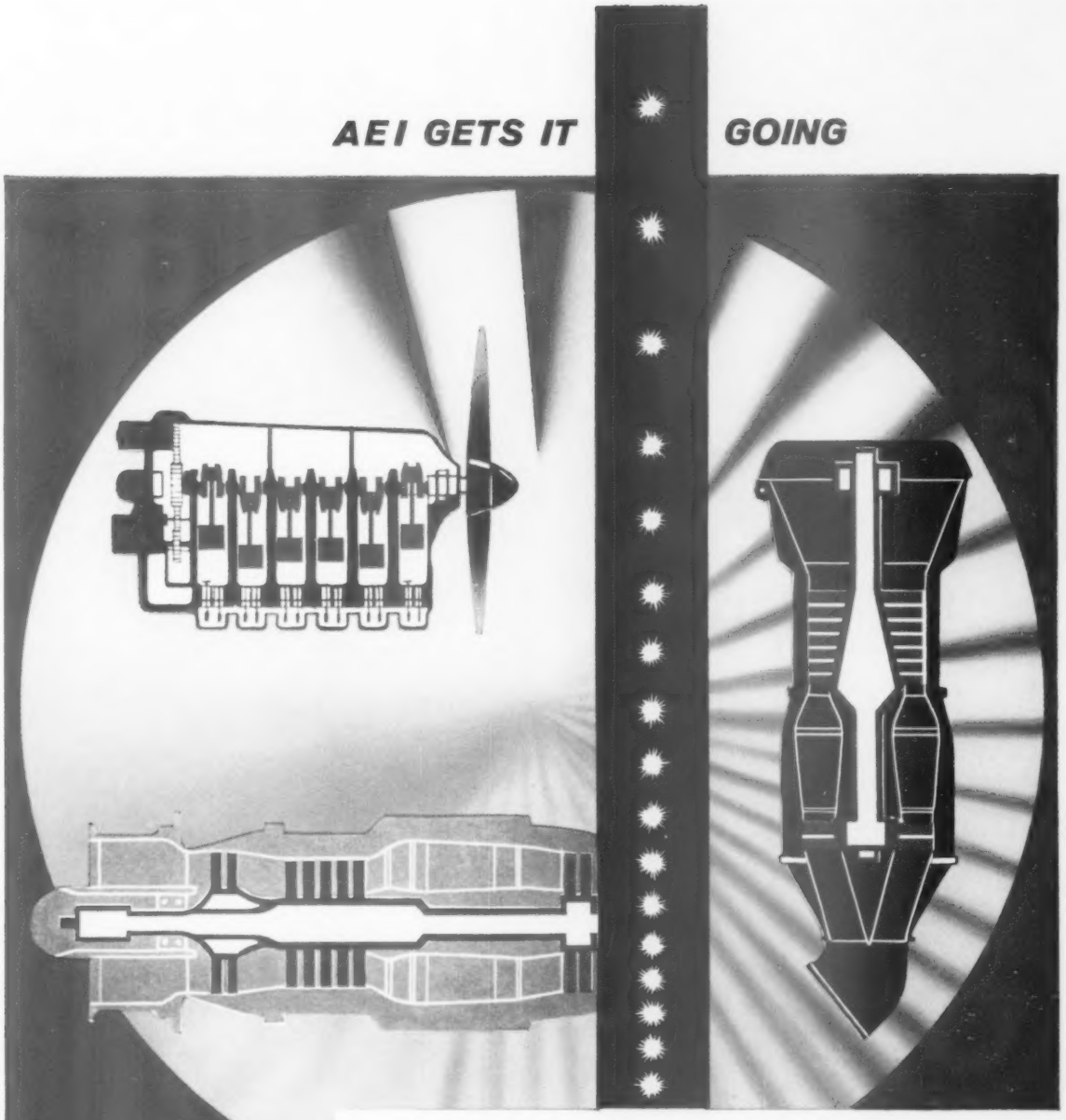
The VHF transmitter provides crystal control operation on 360 channels in the 118-135.95 Mc/s. frequency range. The associate receiver provides reception on 560 crystal-controlled channels between 108 and 135.95 Mc/s. and can be used alone for communications, or with the navigation unit to supply VOR/localizer course information. Localizer indication, manual Omni-range and automatic Omni-range are provided by the navigation unit and the two remaining units—the marker

(*Continued on page 491*)



A dual communications, single VOR/ILS/marker Elliott 21 Series installation in a Piaggio P.166.

## AEI GETS IT GOING

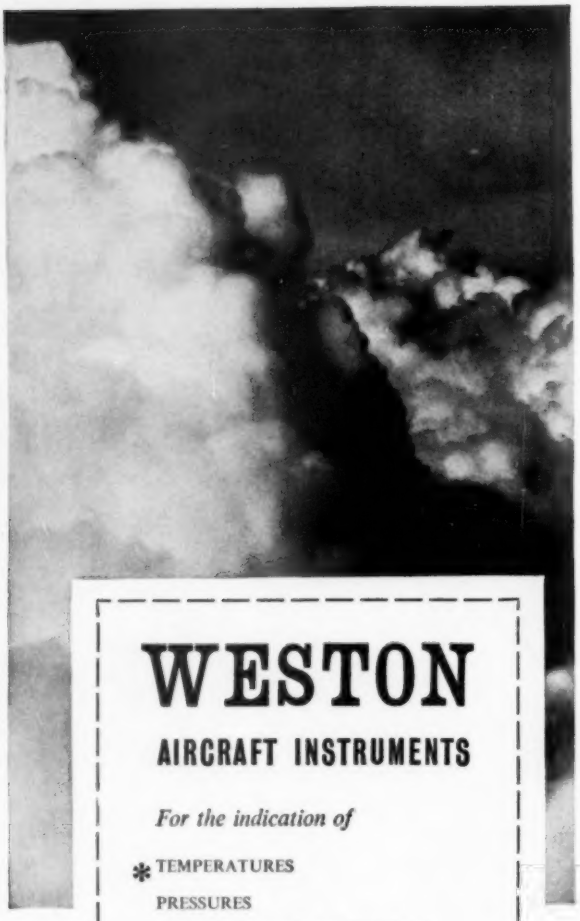


## ...AND KEEPS IT GOING

'Ignition on!' and an aircraft power plant bursts into life... AEI power starts it. Every electrical requirement for aircraft is met today by AEI, from ignition equipment for turbine or piston engines, to the supply of switchgear, generator sets, and the development of complete electrical systems for future flight projects. The efficiency and reliability of AEI electrical equipment is appreciated today by manufacturers and operators of leading aircraft of all types.

AEI

Associated Electrical Industries Limited
Aircraft Equipment Group
COVENTRY, ENGLAND



# WESTON

## AIRCRAFT INSTRUMENTS

*For the indication of*

* TEMPERATURES
PRESSURES
CONTROL SURFACE POSITIONS
TURBINE SPEEDS
ELECTRICAL POWER

*Also*

Navigational Aids · Ground Test Sets
Ice Warning Systems · Relays etc.

* *Model S110G. Resistance Type Thermometer Bulb. Model S63 form 4—typical dial layout.*

## SANGAMO WESTON LTD

**ENFIELD · MIDDLESEX**

Tel: Enfield 3434 (6 lines) & 1242 (6 lines) Grams: Sanwest, Enfield. Scottish Factory: Port Glasgow, Renfrewshire, Port Glasgow 41151. Branches: London, CHAncery 4971 Glasgow, Central 6208 · Manchester Central 7904 Newcastle-on-Tyne, Newcastle 26867 · Leeds, Leeds 30867 Liverpool, Central 0230 · Wolverhampton, Wolverhampton 21912 · Nottingham, Nottingham 42403 · Bristol, Bristol 21781 · Southampton, Soton 23328.

SANGAMO WESTON

SW98

# Cessna

## a range of thoroughbreds

The 310F

The 210

The SKYLANE

The 182

The 175

The 172

*much more for the money*

## APPOINTED REGIONAL DEALERS

| | |
|---|---|
| **THE NORTH & WEST MIDLANDS** | Westair Limited, Squires Gate Airport, Blackpool, Lancs. |
| **EAST ANGLIA & EAST MIDLANDS** | W. H. & J. Rogers (Engineers) Ltd., Gt. Barford, Bedford. |
| **WEST** | Steels (Aviation) Limited, Clifton, Bristol. |
| **SCOTLAND** | Airwork Services Limited, Perth Aerodrome, Perth, Scotland. |

FULLY COMPREHENSIVE SALES AND SERVICE FACILITIES

***AIRWORK SERVICES***

**PANSHANGER AERODROME · HERTFORD**

**Telephone: Essendon 315**

CRC/BUA/41

# *Executive and Personal Aircraft . . . .*

(*Continued from page 490*)

receiver and the glide-slope receiver—complete the marker and ILS glide-slope receiving facilities and the equipment.

Prices vary according to the facilities required, rising from approximately £2,000 for a communications system to about £4,000 for complete comm./nav.

**KING RADIO**

Modular or "building block" design is a feature of the comm./nav. equipment produced by the King Radio Corporation of Olathe, Kansas. The company's basic unit is the KY-90 VHF crystal-controlled transceiver. A 90-channel set operating in the 118 to 126.9 Mc/s. range, it weighs less than 8 lb., including power supply/modulator unit.

To this unit can be added the KR-40 navigational receiver and KI-200 indicator to provide a complete 100-channel crystal controlled VOR system in the 108-117.9 Mc/s. band. With the addition of the KR-50 Omni, localizer and glide-slope receiver and the KI-210 indicator in place of the KR-40 and KI-200, full VOR/ILS facilities are available.

In addition to the KY-90, King have a number of more comprehensive transceivers, including the KY-100 comm./nav. unit which has all the features of the KY-90 and KR-40 in a single 9-lb. box, including the power supply unit. There is also the KX-120 comm./nav. unit—a 360-channel version of the KX-100—and the 360-channel KX-130 comm./VOR/ILS equipment.

In America the prices of the transceivers (28 V.) start at $945 for the KY-90, including power supply unit. The KI-200 VOR indicator is priced at $645 and the KI-210 VOR/ILS indicator at $995.

**MARCONI**

For the more comprehensive executive aircraft there is the new "Sixty Series" radio-aid equipment introduced by Marconi's Wireless Telegraph Co., Ltd., at the 1960 S.B.A.C. Show. Miniaturization and reliability are the two main features of this design and a complete installation, comprising the AD 160 VHF communications system, the AD 260 VHF navigation system and the AD 360 automatic direction finder, weighs 80 lb.

The AD 160 communications transmitter provides 360 crystal-controlled channels in the 118-135.95 Mc/s. band. Used in conjunction with the 560-channel comm./nav. receiver it makes a complete VHF communications system.

In conjunction with the comm./nav. receiver, the AD 260 navigation system provides ILS localizer and VOR beacon instrumentation outputs. With the addition of AD 260 glide stop and marker receivers, full ILS facilities are provided. A development of the Marconi AD 712 fixed-loop director finder, the AD 360 ADF weighs 18½ lb. and can be used with the new twin-needle 4637 RMI.

Another pilot-operated radio-aid which has been fitted in such types as the Cessna 310, Dove, Heron, Piaggio P.166 and Super Aero 45, is the Marconi AD 722 sub-miniature radio compass. Operating in three bands between 200 and 1,700 kc/s., it provides automatic visual bearing information on panel-mounted azimuth indicators to an accuracy of not worse than ±2°. A typical AD 722 installation has a total weight, including racking and cables, of 37 lb., and costs £890.

**NARCO**

A wide selection of radio-aid equipment is manufactured by the National Aeronautical Corporation of Fort Washington, Pennsylvania. One of the most popular is the Narco Simplexer VHF communications unit which provides 27 channels in the 118.1-126.7 Mc/s. band. It has an installed weight of 12 lb. and the American price is a little over $500, without power supply.

In the same category is the Narco Superhomer fitted with a 12-channel crystal-controlled transmitter, a tunable VHF receiver, VOR course selector and indicators, and self-contained power supply. Priced at $575, it has an installed weight of 11 lb.

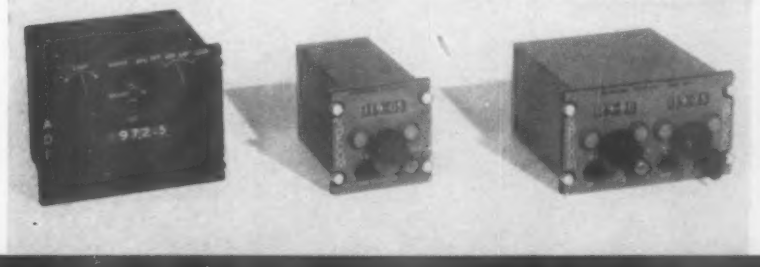
Further up the scale is the Narco Mk. 5 fully crystal-controlled VHF communications set. This contains a 90-channel transmitter and a 190-channel receiver and weighs 9½ lb., including power supply. The American price is $998. With the addition of an indicator/course selector and an Omni converter, the Mk. 5 will provide VOR/ILS navigation facilities.

The Narco Mk. 7 communications unit has a 360-channel transceiver operating in the 118-135.95 Mc/s. band and the Mk. 10 equipment combines this 360-channel communications transceiver with a 190-channel receiver to provide crystal-controlled VOR/ILS localizer facilities. The Mk. 7 is priced at $1,195 and the Mk. 10 at $1,695.

Above, the King VOR converter/indicator which, used in conjunction with an appropriate navigational receiver, provides Omni-range and localizer information.

Right, the Nova-Star VHF transceiver and Omni-range meter manufactured by Nova-Tech Inc., of California.

Below, controllers for the new Marconi "Sixty Series" radio-aid equipment. Left to right, ADF, VHF communications only, and full VHF comm./nav. units.



Other equipment manufactured by Narco includes two Sapphire VHF comm./nav. systems for 90-360- or 90-560-channel operation; the UDI-2 DME installation, and model 29 ADF.

**NOVA-TECH**

The latest VHF radio to be designed for light aircraft by Nova-Tech Incorporated of Manhattan Beach, California, is the Nova/Star. Based on the company's earlier TR-102A transceiver, the Nova/Star has a 23-channel crystal-controlled transmitter and a 108-130 Mc/s. tunable receiver. Employing sub-miniaturization, the complete installation weighs 9 lb. and is supplied with 10 crystals. The price is $385.

Designed to operate with this or other VHF receivers is the Nova/Star Omni-range meter. Providing VOR left/right deviation and to-from indications to a guaranteed accuracy of ±2°, it weighs 12 oz. and can be mounted in a standard instrument position. The American price is $385.

**PLESSEY**

The Plessey Co., Ltd., of Ilford, manufacture a lightweight small-size VHF transmitter-receiver known as the Type PTR 161. Providing six crystal-controlled channels in the 116-132 Mc/s. band, it has a single control for tuning both the receiver and transmitter after the channel has been selected. This control, together with a meter presentation for indicating the optimum tuning position for all circuits, is available for both local and remote position operation.

Front panel controls in the local control version comprise on-off switch, channel selector, tuning control and tuning meter. There are two standard remote control units and a dual remote control installation.

Fully tropicalized, the PTR 161 is designed for independent mounting but can be supplied to fit standard S.B.A.C. racking. The combined weight of the transmitter-receiver, including power unit, and the remote controller is 17.6 lb. It has a range of 50 miles plus, at 3,000 ft.

**R.C.A.**

The Radio Corporation of America in Los Angeles has produced the AVQ-50 weather avoidance radar kit assembly for retrospective fitment to aircraft having weight, space and power restrictions. Suitable for installation in such executive types as the Aero Commander, Gulfstream or Twin Bonanza, the AVQ-50 is available with a 3-in. or a 5-in. indicator unit.

Both indicator units have range scales of 20 and 80 miles and can be used for terrain mapping.

The complete AVQ-50 kit assembly weighs approximately 50 lb. Ex-works price is around £4,000 from R.C.A., Great Britain, Ltd.

*Executive and Personal Aircraft . . . .*

# Principal Types Reviewed

*In the following pages are listed, in alphabetical order by company names, the principal aircraft in Europe and North America available or projected for private, executive, or club use. Utility types have been largely excluded.*

**AERO COMMANDER, INC.** Four versions of the Commander are currently available, with virtually identical airframes powered by two 260-b.h.p. Continentals (500A) or two 290-b.h.p. Lycomings (500B) or two 350-b.h.p. geared Lycomings (560F), or two 380-b.h.p. geared and supercharged Lycomings (680F). These types are distinguished by their excellent payload and cruise performance, and unusually long-range capability; more than 1,000 have been built.

The "slim-line" nacelles and flat-stowed undercarriage mainwheels are now standard in the 1961 range, which will probably be extended to include the Commander 680P, with a pressurized cabin for its seven occupants.

U.K. agents are Field Aircraft Services, Ltd., 72 Wigmore Street, London, W.1.

The second prototype M.S.880 Rallye conforms to production standards with a 100 b.h.p. Continental, and is being flight-tested for a C. of A.

Now undergoing flying trials in Canada is the rebuilt Avian 2/180 Gyroplane.

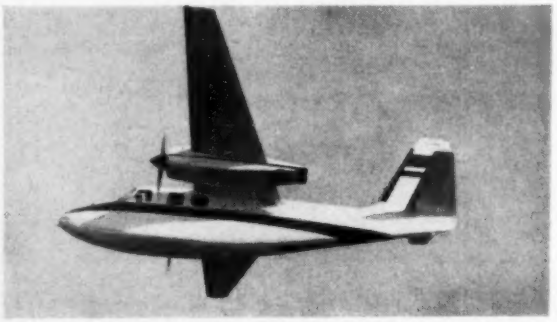
**AEROPLANES MORANE-SAULNIER.** One of the most successful of recent light aircraft designs has been the Morane-Saulnier Rallye which, as an all-metal three-seat tourer/trainer with slats and slotted flaps, has gained more than 270 confirmed orders since its first flight on Jne. 10, 1959. The second prototype, to production standards, recently completed its certification trials, and the third aircraft, which will be the first M.S. 885 Super-Rallye, with a 145-b.h.p. Continental, has now been completed. The M.S. 880 Rallye 02 has the 100-b.h.p. Continental O-200-A engine, and will be the alternative production version; the 90-b.h.p. variant will not now be produced.

New construction techniques and large-scale tooling have made it possible to offer the Rallyes at a very low sales price, which accounts for their World-wide acceptance. The Morane-Saulnier Paris four-seat executive jet is in continuing production, and the Series II aircraft, with the more powerful Marboré VI engines is now available.

U.K. distributors are the London Aero Club, Panshanger Aerodrome, Herts.

**AIRCOUPE DIV., AIR PRODUCTS, INC.** The two-seat all-metal Aircoupe is now in production at Carlsbad, New Mexico, where it was taken over in mid-1960 by a new company. More than

One of the most attractive of the American light aircraft imported into the U.K. is the two-seat, all-metal Aircoupe.



Field's Aero Commander 560F demonstrator shows off its clean lines and new slim nacelles.

5,700 examples of this stall-resistant and spin-proof aircraft have been produced during the past 20 years, and its construction is planned to reach 500 units a year by late 1961. The Aircoupe is offered in three versions, ranging from the Trainer, with basic instruments and equipment, to the Executa, which is furnished with full IFR instrumentation and radio. It is also available, as originally produced, as a two-control aeroplane with no rudder pedals, although normally fitted with conventional dual controls.

U.K. and West European agents are Air-Rent Ltd., Stapleford Airfield, nr. Romford, Essex.

**AVIAMILANO.** Apart from production of the F.14 Nibbio, described under the activities of Ing. Frati, this Italian company is constructing a series of 50 P.19 Scricciolo two-seat trainer/tourer monoplanes for the Aero Club of Italy. Of simple design and construction, with a fabric-covered welded steel-tube fuselage and wooden wing, the P.19 can have tailwheel or tricycle gear. The 90-b.h.p. Continental may also be replaced by the 100-b.h.p. O-200-A; and a still more powerful version, with a 145-b.h.p. Continental, is projected for glider-towing.

**AVIAN INDUSTRIES, LTD.** The second prototype Avian 2/180 Gyroplane has been undergoing trials for evaluation and certification, and limited production is planned for later this year. This Canadian company was formed in February, 1959, to develop a VTOL gyroplane for personal and business use, and has had the advice and assistance of the Department of Transport. A prototype two-seater was designed and built within a year, but taxiing trials were interrupted last Spring by an accident which damaged the airframe beyond repair. Work on the second prototype started at once, and this is the aircraft undergoing the current test programme. Powered by a 180 b.h.p. Lycoming engine, the Avian is a jump-start type gyroplane, the energy from rotor spin-up providing vertical lift for take-off. In such gyroplanes, the rotor is then declutched from the engine to autorotate, forward thrust being provided in the 2/180 by twin shrouded fans or propellers at the rear of the fuselage. This seats two occupants in tandem in the prototype, which uses glass fibre plastic covering and fatigue-resistant alloy-steel keel, rotor column and wheel struts.

**AVIONS FAIREY, S.A.** By the end of 1960, more than 50 diminutive Tipsy Nippers had been built at the Belgian factory, but future production plans are uncertain because of Avions Fairey commitments with the European F-104G programme.

(*Continued on page 493*)

# PIAGGIO of GENOA

PIAGGIO

Businessmen

Governments

Charter operators

Airlines

Oil prospectors

Air surveyors

Italian Air Force

## P.166

# A Family of Business Aircraft

### AUSTRALIA

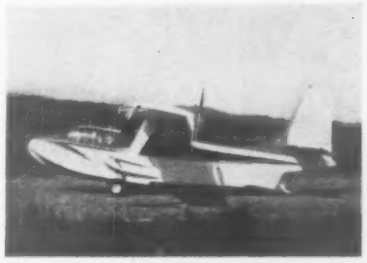
Department of Civil Aviation
Consolidated Zinc Corporation

### BRITAIN

The Earl of Derby
Sir Robert McAlpine & Sons Ltd
*three P.166*
The United Steel Companies Ltd

### ITALY

Aeronautica Militare
*Italian Air Force*
AGIP Mineraria
*two P.166*
Ing Ferrero
Finsider



**DISTINGUISHED FORBEAR**

Used for ten years by business flyers in Europe and America and by the Aeronautica Militare, P.136 amphibians were sold in 1960 to the

Peruvian Air Force
Government of East Pakistan
Macau Air Transport

### WEST GERMANY

Delta Kühlschrank GmbH
Deutsche Nachlucht DNL
*two P.166*
Deutsche Taxiflug
Hansa Luftbild
*air survey version*

### NEW GUINEA

Mandated Airlines
*two P.166*
Papuan Air Transport Patair
*four P.166*

### NIGERIA

Executive Council of Northern Nigeria

### SWITZERLAND

Buchdruckerei Carl Meyer

### U.S.A.

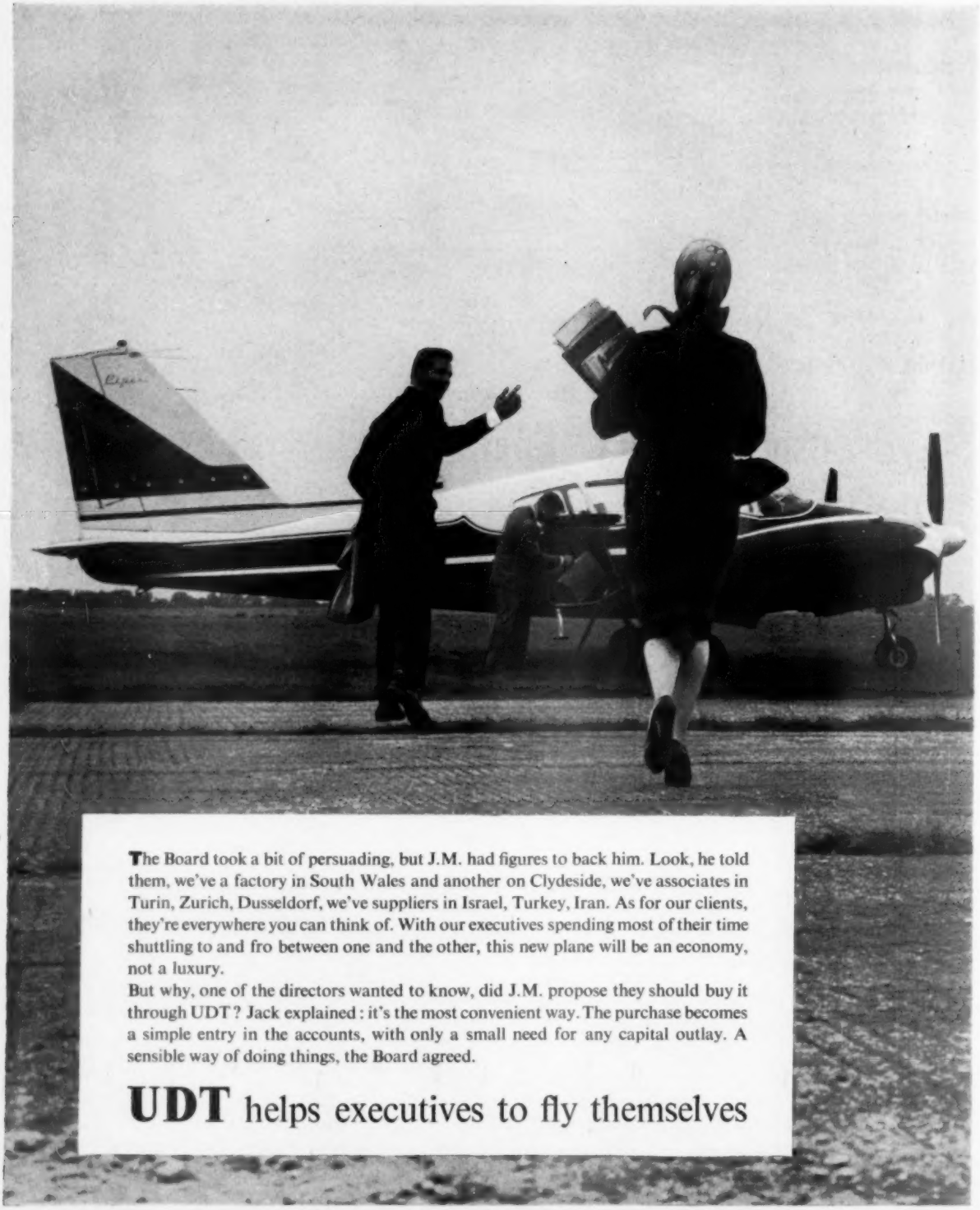
Trecker Aircraft Corp
*three P.166*

*British Representatives*

**AERO-ENTERPRISES**
(Boreham Wood) Ltd
17 Drayton Rd, Boreham Wood ELS 2688

# Jack Milligan buys a business plane

*(Sales Director, Layton-Ross (Overseas) Ltd)*



The Board took a bit of persuading, but J.M. had figures to back him. Look, he told them, we've a factory in South Wales and another on Clydeside, we've associates in Turin, Zurich, Dusseldorf, we've suppliers in Israel, Turkey, Iran. As for our clients, they're everywhere you can think of. With our executives spending most of their time shuttling to and fro between one and the other, this new plane will be an economy, not a luxury.

But why, one of the directors wanted to know, did J.M. propose they should buy it through UDT? Jack explained: it's the most convenient way. The purchase becomes a simple entry in the accounts, with only a small need for any capital outlay. A sensible way of doing things, the Board agreed.

**UDT** helps executives to fly themselves

UNITED DOMINIONS TRUST (COMMERCIAL) LIMITED · UNITED DOMINIONS HOUSE · EASTCHEAP · LONDON · EC3

## *Executive and Personal Aircraft . . . .*

Resembling a baby Comanche, the all-metal four-seat GY-80 Horizon, designed by Yves Gardan, is an attractive touring and business light plane.

(*Continued from page 492*)

Motive power for this highly aerobatic single-seater is an adapted Volkswagen engine, which in the Nipper T.66 Mk. 2 is a 45-b.h.p. STAMO 1400A unit with dual ignition for a full C. of A.

A prototype Nipper has also flown with a new Belgian aero-engine, produced by Fabrique Nationale. This is eventually destined, according to reports, for a two-seat version of the Nipper known currently as the Bipper.

U.K. distributors are the Association of British Aero Clubs and Centres, 7c Lower Belgrave Street, London, S.W.1, who offer the Nipper in kit form, ready for assembly, for £1,115 or the complete aircraft for £1,275, duty paid.

**AVIONS YVES GARDAN.** Latest product of this well-known French light-aircraft designer is the four-seat GY-80 Horizon 150, an all-metal monoplane in the modern manner, with a retractable tricycle undercarriage. The prototype has been flying since July, 1960, all production jigs have been made, and five aircraft are being assembled. The first is a de luxe version, with variable-pitch propeller and full IFR instrumentation, while the second will be used for structural tests, and the others are for firm orders. The undercarriage and Fowler-type flaps of the Horizon are electrically operated, and the tailplane is a single-piece "slab" type. French and American Cs. of A. are expected by July, 1961. The Horizon will be offered at a very low price in relation to comparable types—around £5,000 in the U.K., including duty.

**A. V. ROE AND CO., LTD.** Avro's twin-Dart transport, the 748, which is a replacement for the DC-3-class aircraft, is projected in executive form, the 748X. The roomy pressurized cabin of the 748, which normally accommodates up to 44 passengers, lends itself to a variety of attractive layouts for executive operation, and cruising speeds of 250-290 m.p.h. are combined with an excellent short-field performance.

**BAY AVIATION SERVICES CO.** Formerly known as Oakland Airmotive, Basco have developed a twin-engined conversion of the Beech Bonanza known as the Super-V. Basco do not sell the complete aircraft, but offer a conversion service costing between $22,500 to $26,695, according to equipment and finish, for customers' own Bonanzas. Two 180-b.h.p. Lycoming O-360s, derated to 170 b.h.p. each are installed and the original Continental in the nose is replaced by a baggage compartment, radio racks and a combustion heater. In a Basco Super-V, PanAm Captain Charles Banfe recently flew a 22,000-mile trip round the World in 212 hr.

**BEECH AIRCRAFT CORPORATION.** This company is maintaining its policy of producing high-quality and high-performance designs for general aviation, with above-average strength factors for maximum safety. Beech aircraft are, therefore, in the upper price bracket among lightplane constructors, but their output is nevertheless the third highest in quantity throughout the World. In terms of financial return, Beech is second only to Cessna.

The 1961 Beech range starts with the four-seat Model A33 Debonair, which is generally similar to the more expensive M35 Bonanza, except for the latter's Vee tail, 260-b.h.p. Continental IO-470-N instead of a 225-b.h.p. IO-470-J, extended Hoerner wing-tips and more luxurious furnishing. A fifth seat is now available for the Bonanza.

A new version of the smallest Beech twin, the Travel Air, is offered for 1961. The B95A has 180-b.h.p. Lycoming IO-360-B1A engines introducing fuel injection, and a 100-lb. increase in gross weight to 4,200 lb. This gives the B95A a useful load of 1,645 lb., which may include up to five people in the extended cabin, and their baggage in an extended nose compartment. A newcomer to the Beech range is a further development of the Travel Air, the Model 55 Baron, which is a full five-seater, powered by two 260-b.h.p. Continental IO-470-L fuel-injected engines. The Baron will carry its capacity payload of 1,130 lb. over a stage of 450 n.m. at 160 knots at 5,000 ft. Structural design is to the usual high Beech standard, flight load factors at gross weight being +4.4*g* and −3*g*.

Two versions of the six-seat Twin-Bonanza are currently produced, the D50E, with two 295-b.h.p. Lycoming GO-480s, and the J50, with two supercharged 340-b.h.p. IGSO-480 engines. The latter powerplants are also installed in the Model 65 Queen Air, which has an extended fuselage seating up to eight persons, including a crew of two, if required.

All these Beech twins cruise at well over 200 m.p.h. at economical power settings (65%), and this remains true of the veteran Super G18, which has been in production since before World War II. The 1961 Super G18 introduces wide "picture" windows in its fuselage, plus many other refinements, and its popularity as a 6-9 seater is therefore likely to be maintained.

Spinners have been added to the latest production variant of the veteran Beech G18S, which also has "picture" windows and a more pointed nose.

The 1961 M35 Bonanza introduces additional rear windows for the optional fifth seat.

Many modifications have appeared on the 1961 Beech B95A Travel Air, which is also available as a five-seater, as shown.

Extra windows also feature in the 1961 Model 50 Twin-Bonanza, which has an air-stair entrance and other modifications.

## *Executive and Personal Aircraft . . . .*

More than 7,000 have been produced to date, and while production continues with the tailwheel configuration, a number of nosewheel conversions are being offered. These include the Rausch Star modifications, which comprise a rearward-retracting nosewheel and forward-folding mainwheels, and the Volpar tricycle gear with forward-stowed legs.

Future developments among the Beech twins are reported to include the application of turboprop power to the larger types, and the installation of turbo-supercharged engines in the Baron.

Main distributors for the Beech range in the U.K. are Short Bros. and Harland, Ltd., Queens Island, Belfast.

**BELL HELICOPTER COMPANY.** Rotorcraft available for executive use from this major American helicopter company currently comprise the Model 47J-2 Ranger, which is a four-seat de luxe version of the widely used 47G, and the turbine-powered Model 204, civil adaptation of the U.S. Army's HU-1 Iroquois. The Model 47J-2 has a 305-h.p. Lycoming VO-540 engine derated for a continuous output of 240 b.h.p., which compares with a similar two-minute output for the derated 260-b.h.p. VO-435 of the 47J-1. The latter type is still produced under licence by the Italian Agusta company, which is also developing the Model 204B for utility use, with a D.H. Gnome turbine in place of the Lycoming T53 of the HU-1. The Bell Model 204B may seat up to eight for executive use, and is powered by a 1,100-s.h.p. T53-L-9.

Agents for Bell and Agusta/Bell helicopters in the U.K. are Messrs. Hordern-Richmond, Ltd., Bristol Road, Gloucester.

**BOLKOW-ENTWICKLUNGEN KG.** Bölkow has many interests in German aviation, ranging from light aircraft to missiles and electronics. It acquired complete manufacturing rights for the wooden Klemm K1 107C tourer/trainer, which is a three-seater of classical configuration. The K1 107C is used for Lufthansa crew training, and is fully aerobatic; 150 have been built. A four-seat development of the K1 107C, originally designated the 107D, is now known as the Bölkow 207, with the 180-b.h.p. Lycoming O-360 engine. Thirty-five are on order. It retains the wooden construction, aerobatic capability and layout of the K1 107C.

U.K. agents are Flair-Aviation Sales, Tower House, College Road, Bromley.

**BRANTLY HELICOPTER CORPORATION.** The two-seat Brantly B-2, with its basic f.a.f. price of $19,950, is the cheapest helicopter so far available. Following its F.A.A. certification in April, 1959, 24 were sold during that year, with further deliveries during 1960. Production was planned at one B-2 per week, and there have been a number of overseas sales. The B-2 rotor system is to be used in a new six-seat twin-engined tandem design under development by Brantly.

A subsidiary company at 131 Ystrad Road, Fforestfach, Swansea, handles the B-2 in the U.K.

**BRITISH EXECUTIVE AND GENERAL AVIATION, LTD.** With the appearance of this issue of THE AEROPLANE AND ASTRONAUTICS comes the first release on the initial products of the BEAGLE Group, the BEAGLE-Auster A.109 Airedale and the BEAGLE-Auster A.61 Terrier. Fuller details of the Airedale are to be found elsewhere in this issue; the Terrier is a civil two/three-seater developed from the military Auster D.6 with a 145-b.h.p. Gipsy Major 10. BEAGLE was formed on Oct. 7, 1960, to design, develop and build in quantity a new range of British light and executive aircraft for personal, club and business use, as a subsidiary of the Pressed Steel Co., Ltd., of Cowley, Oxford.

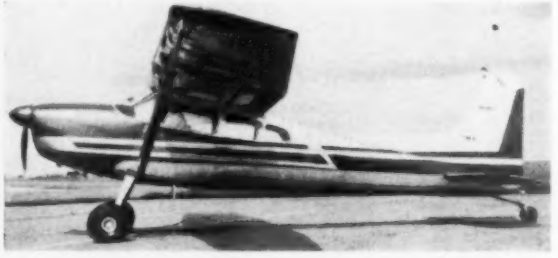
Cheapest production helicopter currently available is the two-seat Brantly B-2, seen here with British registration.

BEAGLE later acquired the companies and facilities of F. G. Miles, Ltd., of Shoreham, Sussex, and Auster Aircraft at Rearsby, so that its efforts in the light aircraft field are on a three-pronged basis. The parent group has the Masefield-BEAGLE design office, under Mr. R. J. Woodhams, as chief designer, for a range of specialist and rather larger executive, communications, advanced training and business aircraft. BEAGLE-Auster are continuing at Rearsby, under Marcus Langley, chief engineer, initially with the development of the well-established Auster high-wing range, starting with the production of the Airedale and of the converted Auster Mk. 6, the Terrier.

Third branch of the BEAGLE family, BEAGLE-Miles, retains much of its original identity under chief designer G. H. Miles, and will continue the development of low-wing light aircraft from the point where the popular Messenger and Gemini had reached before production stopped.

The entire BEAGLE family will eventually cover a comprehensive range of touring, training, executive, private and club aircraft from two-seaters up to a size which has not yet been finalized. The military market will also not be ignored, and production is continuing of the BEAGLE-Auster Mk. 9 for the British Army.

Essential to the plans of all the BEAGLE projects is the production of Continental light aero-engines in the U.K. by Rolls-Royce, Ltd. All BEAGLE designs are eventually to be Rolls-Royce/Continental powered.



Cessna's big Model 185 Skywagon is a utility addition to the 1961 range.

**CESSNA AIRCRAFT COMPANY.** This Wichita company continues to maintain its position as the largest producer of light aircraft in the World, and during 1960 sold 3,721 machines, which was some 123 more than the combined total of all other U.S. manufacturers. Many new features accompany the introduction of the 1961 Cessna range. Nearly all the six basic single-engined models in production incorporate detailed improvements, and a seventh design, the utility Model 185 Skywagon, has been added to the range.

Smallest of the range, the two-seat Model 150, of which more than 1,000 have been sold in the past two years, has a redesigned instrument panel, a 2-in. rearward relocation of the mainwheel legs for improved ground handling and various other refinements.

Cessna's four-seat Model 172 outsold every other type of

Above, the 1961 Cessna 150 has its spring-steel mainwheel legs moved farther aft for better ground stability, a redesigned panel and other improvements. Below, the 1961 Model 172. More than 1,000 were sold of the 1960 version.

The latest Cessna 310, Model F, (below) has even more rakish lines from its pointed nose, spinners and tip-tanks.

Czech single-engine types for sporting and touring flying comprise the four-seat L-40 Meta-Sokol (left), and the aerobatic Zlin Trener-Master.

light aircraft in production during the 1960 marketing year, with a total of 1,015 sold, bringing the total since late 1955 to about 5,000. The 172 is joined this year for the first time by a de luxe model, the Skyhawk, which incorporates all the improvements in the 1961 range, including a modified fuselage, a 3-in. shorter undercarriage, a corresponding increase in height in the engine mounting to provide similar airscrew clearance, and an outside baggage door.

The undercarriage of the Model 182 and Skylane has also been lowered by four inches, and the nosewheel now has a Model 210-type fork for greater strength. In its tailwheel form, as the Model 180, there has been no change in undercarriage height. About 3,800 Cessna 180s had been sold by late 1960, plus more than 2,150 182s and some 1,900 Skylanes.

Demand for the six-seat Skywagon is expected to be great, on wheels, skis or floats. The 210 (610 sold first year) has the restyled instrument panel, key ignition starter, increased visibility and head room, new heating and ventilation, plus revised interior and exterior styling. Sales of the twin-engined Model 310 total about 1,500 to date, and the 1961 variant has revised interior and exterior styling, plus some detailed mechanical refinements.

Three new twin-engined aircraft are planned by Cessna to gain this company leadership in the multi-engined field. Most radical is the Model 336 Skymaster, which has two specially adapted Continental engines in pusher-tractor installations and a twin-boom airframe. The engines are probably variants of the 175-b.h.p. GO-300-C powerplant, and are mounted fore and aft in the fuselage to eliminate problems of asymmetric handling for non-professional pilots. The Skymaster made its first flight early in March this year, and is due for production by 1962. During the same year, the Cessna 320 will be marketed, as a five-seat development of the 310 with turbo-supercharged and fuel-injected Continental engines, and a 240 m.p.h. cruising speed. A later development will be the 8-10-seat Model 410, which will be in the 250 m.p.h., 8,000 lb. category.

Cessna distributors in the U.K. are Airwork Services, Ltd., Panshanger Airfield, Herts, and regional dealers include W. H. and J. Rogers (Engineers), Ltd., Aviation Div., Great Barford, Bedford (East Anglia) and Westair Flying Services, Squires Gate Airport, Blackpool (North and Midlands).

The 95-b.h.p. Champion two-seater is produced with either a tailwheel, tricycle, or reversed tricycle as shown above on the Tri-Con.

**CHAMPION AIRCRAFT CORPORATION.** The large and complex family of Champion high-wing aircraft use the same basic airframe, with a variety of undercarriage layouts and powerplants. Versions of tandem two-seater with 90 b.h.p. Continental include 7EC Traveler, with tailwheel; 7FC Tri-Traveler, with new lower and wider nosewheel gear in 1961 model; and 7JC Tri-Con, with reversed tricycle undercarriage to overcome former ground instability of Tri-Traveler. Champion 7GC Sky-Trac has more powerful Lycoming O-290 engine (140 b.h.p.) and tailwheel undercarriage, and can accommodate two persons of light weight in rear seat, in addition to pilot. The 7HC DX'er is similar, except for its nosewheel undercarriage, and has wheel instead of stick control. A still more powerful version of the Sky-Trac is the 7GCB Challenger, with a 150 b.h.p. Lycoming O-320 for agricultural use, while a clipped-wing variant of the Challenger for business flying is the de luxe 7KC Olympia. Span is reduced from the standard 33 ft. 5 in. to 30 ft. 5 in., and cruising speed is 135 m.p.h.

U.K. distributor for Champion aircraft is Edward Drewery, Esq., 128 Station Road, Sidcup, Kent.

In its latest form, the Aero 145 is powered by two supercharged M-332 engines, and is an occasional five-seater.

The Morava L.200A (below) has supercharged M-337 engines, and is a full five-seater of all-metal construction.

**CZECHOSLOVAK AIRCRAFT WORKS.** With a long tradition of light aircraft design and production, the Czechs are now producing a range of machines covering almost every aspect of sporting, private, touring and executive flying. The Zlin Z.226 is perhaps the best-known post-War aerobatic aircraft, and its latest development, the Z.326 Trener-Master, is even better suited to training and exhibition flying. It retains the classic tailwheel layout, but the mainwheels retract aft into the wings, increasing the maximum speed by about 15 m.p.h. Wing-tip tanks may also be carried, while, as in the case of the Z.226, there is a single-seat version known as the Z.326A Akrobat. For touring, the four-seat all-metal L-40 Meta-Sokol is one of the cheapest aircraft in its class, while the Aero 145, also with the supercharged and fuel-injection M.332 engines, is one of the most economical light twins on the international market.

For executive and charter operations, the larger four/five-seat Morava L-200A is in production, and about 75 have been sold to Aeroflot, the Russian airline. With two 210-b.h.p. M.337 supercharged and fuel-injection engines, and a steerable nosewheel undercarriage, the L-200A conforms fairly closely to the modern American formula, but once again in a lower price bracket. A turboprop-powered version, the L-300, is reported to be under development.

U.K. agent for the Czech range is Peter S. Clifford and Co., Ltd., Oxford Airport, Kidlington, in conjunction with Gp. Capt. E. L. Mole.

**DASSAULT-SUD.** A larger version of the G.A.M.D. 415 Communauté is proposed by this French consortium for executive and transport use, and has been designated the M.D.415A1 or Diplomate. This is planned to be sold in the U.S. in conjunction with Turbo Flight Inc. of Chicago. The Diplomate is 25% larger than the Communauté, of which a prototype has been flying for some time, and will be similarly powered by two 1,000 e.h.p. Bastan turboprops. Accommodation for eight passengers will be offered in the executive version, which will be pressurized for 300 m.p.h. cruise at 20,000 ft., over 1,500 miles.

**DE HAVILLAND AIRCRAFT CO., LTD.** Following its extensive executive experience among more than 512 Doves, including the new Mk. 8 or Custom 800, with specially tailored corporate interiors, and a large number of the 140 or so Herons built, this branch of the Hawker Siddeley group is developing the D.H.125 twin-jet transport for business use. An initial batch

## *Executive and Personal Aircraft . . . .*

of 30 D.H.125s are to be built, with deliveries starting in 1963. A number of British and foreign executive operators have already shown interest in this project, which is virtually a Dove replacement, powered by two fuselage-mounted B.S. Viper 20s, each of 3,000 lb. thrust, and having a similar field performance. Accommodation will be for a crew of two and up to eight passengers, for stage lengths of a maximum of 1,500 miles at cruising speeds between 450-500 m.p.h.

**DORNIER-WERKE, GmbH.** In addition to widespread military use in the German and other national air forces, the STOL Dornier Do 27 is available in several civil versions. Smallest is the four-seat Do 27Q-3, with the 230-b.h.p. Continental O-470K, while the Do 27Q-1, Q-4, Q-5 and S models have the 275-b.h.p. Lycoming GO-480 engine and a six-seat capacity. The Q-4 has provision for external fuel tanks, the Q-5 a wider-track undercarriage, and the 27S is float equipped. For high-altitude and heavy-duty operations, the Do 27H-2 is available with the 340-b.h.p. supercharged Lycoming GSO-480 engine.

A twin-engined version of the Do 27, the Do 28, has been developed with two 250-b.h.p. Lycoming O-540s and a similar seat capacity. Span was increased by 5 ft. 11 in. and fuel capacity to 102 Imp. gal. Speed range is 44-161 m.p.h. (max. cruise) for the Do 28, compared with 36-125 m.p.h. for most versions of the Do 27. A 550-b.h.p. Turboméca Astazou IIA has been installed experimentally in a Do 27Q-4, which first flew on Mar. 18.

Combining STOL capability with a brisk cruising performance, the Dornier Do 28 light twin seats four passengers plus two crew.

**FRATI (ING. STELIO).** This Italian designer has produced a series of light sporting and touring aircraft of remarkably sleek appearance and corresponding efficiency, constructed by several manufacturers in Italy.

Aeromere at Trento is building the two-seat F.8L Falco, called, in its latest form to U.S. CAR Part 3 requirements, the America. With a 150-b.h.p. Lycoming, it is fully aerobatic, with an ultimate load factor of 9.4 g, and cruises at up to 180 m.p.h. About 50 have been built to date; one example with a 160-b.h.p. Lycoming is under construction for the U.K. agent, Shaw Aviation Division, Rawson Road, Westgate, Bradford.

A four-seat development of the Falco, the F.14 Nibbio, with a 180-b.h.p. Lycoming engine, is produced by Aviamilano, in Milan, and is of similar all-wood construction.

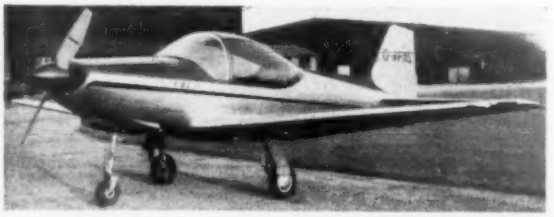
The Procaer company, also in Milan, is engaged in the production of the F.15A Picchio, which takes development of the Nibbio a stage further. With the same capacity and powerplant, the Picchio uses a plywood covering having an outer skin of aluminium, combining the virtues of both wood and metal construction. The Picchio also has a redesigned cabin and a swept fin; 45 were laid down, including 15 of the lower-powered F.15 series, sold in 1959-60. Procaer has also produced a prototype two-seat light jet aircraft, the F.400 Cobra, powered by an 880-lb.s.t. Marboré II turbojet. Using the same metal-clad wooden construction as the Picchio, it is to be offered in both two- and four-seat versions, the latter with a 1,058-lb. Marboré VI.

With Gipsy Queen 70 Mk. 3 engines, developing 400 b.h.p. each for take-off, the Dove 8 has a revised cabin and cockpit for executive use.

**GRUMMAN AIRCRAFT ENGINEERING CORP.** As the first long-range pressurized aircraft designed specifically for the "corporate" market, the Grumman Gulfstream has had widespread sales success since its first flight on Aug. 14, 1958. By the end of April this year, about 72 had been delivered or ordered for executive use. The Gulfstream was designed for the same field requirements as the DC-3, but its 350 m.p.h. cruising speed represents a great increase over most executive types. It can operate from 4,000 ft. strips, and is self-contained, with a rear fuselage gas-turbine A.P.U. and air stairs. Delivered U.K. price is about £300,000, prior to radio installation and furnishing.

The agents are Atlantic Aviation Export Corporation, 169 Chiltern Court, Baker Street, London, N.W.1.

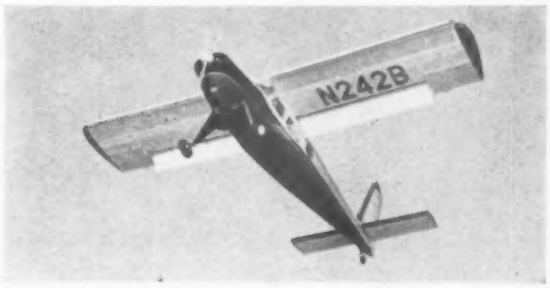
**HAMPSHIRE AEROPLANE CLUB.** Light aeroplane development continues at this Eastleigh, Southampton, centre, under the direction of its secretary and C.F.I., Vivian Bellamy. Construction of the wooden four-seat Halcyon continues slowly, and the prototype, powered by two 105-b.h.p. Walter Minor engines, may fly later this year. The Halcyon is intended as the smallest practical twin for the lowest price—a target of less than £5,000 has been established. The Halcyon has a retractable tricycle undercarriage, and uses a special technique of resin-bonded wrapped ply construction. Successful trials may be followed by a production batch of 12 aircraft. There is also some interest in fitting these with the Rover TP/90 light turboprop. This is being developed in collaboration with the H.A.C., where the first flight trials were completed with the prototype TP/60 in the Currie Wot.



Designed by Ing. Stelio Frati, the F.8L Falco America (above) is built by Aeromere, while the Marboré-propelled 2/4-seat F.400 Cobra (right), is a product of Procaer in Milan.

Contrasting turboprop types are (left) the £420,000 (approx.) Grumman Gulfstream executive carriage, and (above), the £1,000 (approx.) Currie Wot test-bed for the 60 s.h.p. Rover gas-turbine.

Under construction at Eastleigh, Hants, is the four-seat Halcyon light twin.




Now distributed in the U.K. by McAlpine Aviation, the Helio Courier is a STOL 4/5-seater with near-helicopter performance.

**HELIO AIRCRAFT CORPORATION.** A close approach to helicopter performance is achieved by the Helio Courier series, which are capable of operating from an obstructed 400-ft. strip. Two versions of the Courier are currently in production, the H-395, powered by a 295-b.h.p. Lycoming GO-480 engine, and the H-395A, with a 260-b.h.p. Lycoming GO-435. Both accommodate five persons, and have minimum flight speeds under full control of 30 m.p.h., and yet the Super Courier cruises at 172 m.p.h., while the H-395A operates at 163 m.p.h. at a similar 71% power. More than 140 Couriers have so far been built; twin-engined (2 x 250-b.h.p. Lycoming) version, the Helio 500, is under flight development.

U.K. distributors are McAlpine Aviation, Ltd., Luton Airport, Beds.

**HILLER AIRCRAFT CORPORATION.** Development of the basic Hiller UH-12 three-seat helicopter, which in the Model 12E has a 305-b.h.p. Lycoming VO-540-A1B engine, has resulted in the four-seat 12E-4 for executive or charter use. The Model E-4 may be simply adapted from the standard 12E by means of a kit, which includes a 25-in. lightweight aluminium structural insert in the cabin, an additional transparent section in the canopy, and a new horizontal stabilizer incorporating anhedral and sweep on the tail-boom.

U.K. agents are Helicopter Sales, Ltd., 2 Lowndes Street, London, S.W.1.

**HOWARD AERO INC.** Specializing in business aviation, this San Antonio, Texas, company has developed a greatly improved adaptation of the Lockheed PV-1 Ventura as a 10-14 passenger executive transport, designated the Howard 500. It has a fail-safe pressurized fuselage structure, which has been extensively refined aerodynamically, and 25% more wing area as a result of a new centre-section and 3 ft. longer outer wing panels.

**HUGHES TOOL CO., AIRCRAFT DIVISION.** Originally developed to U.S. Army requirements for a light observation helicopter, the Hughes 269A is now being offered for commercial use. Four prototypes have been flying since 1956, and the first production aircraft are due now. The Hughes 269A makes extensive use of belt drives in its transmission, and its components have been designed for long lives. These include Lycoming O-360 engine, 750 hr.; main gearbox, 1,800 hr.; tail rotor gearbox, 1,000 hr.; main rotor blades, 1,400 hr.; tail rotor, 1,000 hr.; shafts, belts and pulleys, 1,000-1,200 hr.

**LAKE AIRCRAFT CORPORATION.** Manufacturing rights for the Colonial Model C-2 Skimmer IV four-seat light amphibian were taken over by Lake in October, 1959, and the first Lake-built LA-4 flew in the spring of 1960. Deliveries of the LA-4 to date have included three to the Government of Thailand for border patrol, one to Puerto Rico and several to American operators. Twelve had been built by the end of 1960; production is planned for three per week by mid-1961.

An interesting general-purpose light aircraft is the Lockheed LASA 60, seen here in second prototype form, with a 260 b.h.p. turbo-supercharged Continental.

In production for commercial use is the $22,500 Hughes 269A two-seat helicopter.

**LANCASHIRE AIRCRAFT CORPORATION.** Although basically a utility aeroplane, this company's Prospector has a possible executive application where there is also a STOL requirement. It has a roomy cabin and cockpit to carry up to six people. Development of the Cheetah-powered Prospector II has now been dropped, but production of the Mk. 1, with the 295-b.h.p. Lycoming engine, is continuing.

**LOCKHEED AIRCRAFT CORPORATION.** First jet aircraft designed specifically for executive use, the Lockheed Model 1329 JetStar has now completed its F.A.A. certification procedures and deliveries to meet the 26 civil orders which had been received by the end of March, 1961, will soon begin. Among the first operators to receive the $1.3 million JetStar will be the Continental Can, Pratt & Whitney, Krupp, Hercules Powder and T. Eaton companies. Powered by four fuselage-mounted Pratt & Whitney JT12A-16 turbojets, each of 3,000-lb. thrust, the JetStar cruises at 506 m.p.h. over ranges of more than 2,600 n.m. at altitudes up to 45,000 ft. Production JetStars have variable-droop outboard leading-edges, in place of slats on the prototype, which introduced the 416 I.G. " glove " tanks on the swept wings. Thrust reversal " clams " on two of the JT-12s provide up to 42% of forward thrust for runway braking, and an 18-ft. tail parachute is provided as a stand-by, for use below 130 knots. Production of the JetStar is at the rate of two per month. Five definitive aircraft are now flying.

For transport on a smaller scale, Lockheed's Georgia Division has developed the Model 60 light utility aircraft, for production in Mexico by Lockheed-Azcarate S.A. as the LASA 60. It is also to be built in Italy by Aeronautica Macchi, and in the Argentine by Aviones Lockheed-Kaiser Argentina. The first prototype, Lockheed-built and with a 250-b.h.p. Continental IO-470 engine, first flew on Sept. 15, 1959, and was followed by a second aircraft identical except for the addition of an AiResearch exhaust-driven turbo-supercharger. The resultant TSIO-470B engine will maintain its 260-b.h.p. take-off power up to 12,000 ft. for high-altitude strip operation. The LASA 60 has a 1,500 lb. capacity payload, and the 120 cu. ft. cabin is readily adaptable for either freight or pilot and five passengers.

Most potent executive transport yet produced is the Lockheed JetStar, which can cruise up to nearly 600 m.p.h.

## *Executive and Personal Aircraft . . . .*

In its production version by SIAI-Marchetti, the Nardi FN-333 Riviera amphibian is being marketed in the U.S. by Lane Aircraft.

**LOCKHEED AIRCRAFT SERVICE, INC.** Extensive modifications to the Douglas B-26 to give it a pressurized fuselage seating 6-9 passengers have been made by this Lockheed subsidiary, to produce the Super 26 for executive use. Other additions include hydraulic airstairs aft of the wing, a dorsal fin and provision for tip-tanks. Cabin altitude is maintained at 8,000 ft. at a cruising height of 20,000 ft., and the Lockheed Super 26 can cruise at up to 375 m.p.h.

**McDONNELL AIRCRAFT CORPORATION.** The prototype Model 220 four-jet executive transport was converted from the Model 119, which was built for the U.S.A.F.'s UCX requirement for a light utility transport. For executive use, the Model 220 is furnished with 10 seats, plus galley and toilet. The prototype has four Westinghouse J34 turbojets, each of 3,000 lb. s.t., but GE CJ-700 turbofans or P. & W. JT-12 turbojets are suggested as alternatives.

**MOONEY AIRCRAFT INC.** The recently introduced Mooney Mk. 21 retains almost precisely the same contours as the earlier Mk. 20 and Mk. 20A, but the former laminar-flow wooden wing has been replaced by an all-metal type. Some changes have also been made in the four-seat cabin, but the only external modification is the addition of a small dorsal fin. The new stressed-skin metal wing has integral tanks, and is reported to have improved low-speed handling. About 700 of the earlier Mk. 20 series were built between 1955 and 1960, and about 330 Mk. 21s are expected to be sold this year.

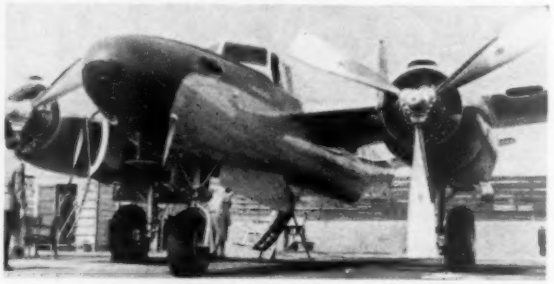
U.K. agents are Travelair, Ltd., 115 Oxford Street, London, W.1.

**NARDI S.A.** After prolonged development, the Nardi FN-333 Riviera four-seat light amphibian has been type-approved by the C.A.A., and is to be produced by SIAI-Marchetti for sale in Europe and the U.S. In the latter continent, the Riviera is being handled by Lane Aircraft at Dallas, Texas. Airframes will be shipped from Italy minus their 250-b.h.p. Continental engines, airscrews and instruments, and will be completed for Lane Aircraft by Southwest Airmotive. U.S. sales price is $34,950, and the prototype has been shipped to the United States for an extensive sales tour. A non-amphibious flying-boat version has also been projected, as the FN-333W.

**NAVION AIRCRAFT CO.** Development and production of the original North American/Ryan Navion have been taken over by this Galveston, Texas, company, which is producing the five-seat low-wing monoplane as the Rangemaster. Wing-tip fuel tanks have been added to the basic design to give an exceptional operating range, and cruising speeds of up to 200 m.p.h. are claimed.

**ON MARK ENGINEERING COMPANY.** One of several American companies specializing in the conversion of Douglas B-26 and other ex-military types for executive use, On Mark has adapted no fewer than 48 of these former bombers for company flying, as the Marketeer, and is now offering a pressurized version, the Marksman. This is being produced in three basic configurations: "A," with standard 666 Imp. gal. fuel capacity and 2,000-b.h.p. R-2800-75/79 engines, for $257,430; "B" with wing-tip tanks and total of 940 Imp. gal., R-2800-83AM-4A engines, Hamilton Std. high-activity airscrews, for $314,475; "C," additional wing fuel to 1,107 Imp. gal., 2,400 b.h.p. R-2800-CB-16/17 engines, w/meth. injection and reversible-pitch, for $361,492. Modifications to the original B-26 include a new fuselage section eliminating the rear wing spar carry-through, hydraulically operated side door-stair, large DC-7 type windows, a new 103-in. nose section for baggage and radar, dual controls and a new instrument panel.

**PHOENIX AIRCRAFT, LTD.** This company was formed in 1958 to develop and make available for amateur construction the pre-War single-seat ultra-light Luton Minor and the two-seat Luton Major. Examples of these aircraft are now being built in many parts of the World, both types having been redesigned and restressed for more powerful engines. Normally powered by the 36-b.h.p. J.A.P. engine, the Luton Minor is now cleared for powerplants up to 55 b.h.p. and a gross weight of 750 lb. From its original 60-b.h.p. Mikron, the tandem-seat Major may go up to 82 b.h.p. and 1,100 lb. gross weight.



One of several Douglas B-26 conversions for executive use is the pressurized On Mark Marksman.

**PIAGGIO & C., S.p.A.** Main production effort of this well-known Italian company is concentrated on the six/eight seat P.166 Executive, which is in widespread use for business flying. About 30 have been built and the Italian Air Force has also ordered 21 for communications duties. It was developed from the P.136 light amphibian, of which more than 80 were built, including 23 for the Italian Air Force. The P.136 is available in two versions, the L-1 with two 270-b.h.p. Lycoming GO-480s, and the L-2 with two supercharged 340-b.h.p. Lycoming GSO-480 engines. Two special versions are also available; the eight-seat P.136L-2 flying-boat, and the seven/eight-seat P.136L-2-DK. All P.166 and P.136 variants are marketed in the U.S. by the Trecker Aircraft Corporation.

U.K. Piaggio representative is Aero Enterprises (Boreham Wood), Ltd., in conjunction with McAlpine Aviation, Ltd., Luton Airport, Beds, who are exclusive spares stockists and dealers.

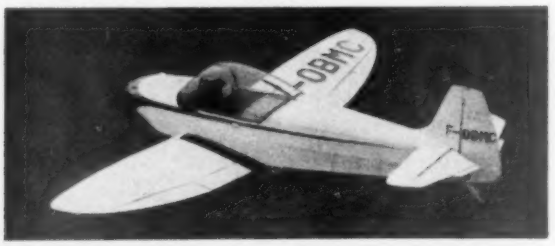
Piaggio is now building two prototypes of the PD-808, a six-seat twin-jet executive designed jointly with the Douglas Aircraft Co., of Los Angeles. The first PD-808, which has a pressurized cabin and will cruise at 500 m.p.h. at 40,000 ft., will fly in 1962.

**PIEL AVIATION S.A.** One of several French light aircraft types which have been widely produced both by manufacturing organizations and amateur constructors, the two-seat Piel Emeraude is built in France not only by its parent company but also by Ateliers Aéronautiques de la Côte d'Emeraude, Scintex-Aviation and Société Ouest Constructions Aéronautiques. Slightly modified versions have been built in the U.K. by Garland Aircraft as the Linnet, and in South Africa by General Aircraft Pty. as the Aeriel Mk. II. Piel versions include the C.P.30, C.P.301A and C.P.302, with 65- and 90-b.h.p. Continentals, and the 90-b.h.p. Salmson radial engine. Scintex-Aviation produce the C.P.301C, also with a 95-b.h.p. Continental.

In the U.K. this last version is marketed by the Tricolore Trading Company, 36 Southampton Street, London, W.C.2.

**PIPER AIRCRAFT CORPORATION.** The Lock Haven, Penn. plant of Piper Aircraft, which has produced more lightplanes (well above 50,000) than any other organization in the World,

(*Continued on page 499*)




The attractive little Piel Emeraude (above) is built in several countries; this example is a Scintex C.P. 301C.

A popular executive transport (left) is the Piaggio P.166, of which five are currently registered in the U.K.

# Keegan Aviation Ltd

associated with T. D KEEGAN LTD

*WHAT WE ADVERTISE WE OWN*

**D.H. Dove.** G-ARDN new interior new paintwork. Half life engines just top overhauled. STR 12 D., STR 9x., AD 7092.—I.L.S. & V.O.R. available as optional extras. Fitted as 8 passenger seater, with toilet and cocktail bar.

**Aero Commander 520.** G-ARJA. Zero hours since C of A. New paint-work, 6 seat interior, 2 V.O.R.'s. I.L.S., 2 V.H.F., A.D.F., fan markers. 120 hours on engines and props. Must be flown to be appreciated. FULL SPECIFICATIONS ON REQUEST.

**Piper Apache 150.** G-ARLI. New C of A. 2 new engines 2 new props. New paint, new interior, a really beautiful and inexpensive executive aircraft. FULL SPECIFICATIONS ON REQUEST.

**Cessna 310.** G-ARGP. Zero time since C of A. New paint and interior. 2 new engines. A really beautiful aircraft.

**AIRCRAFT** *Lease or Sale* — We hold a large range of used aircraft in stock, from airliners to twin engined executives. We will buy any type of used aircraft for cash. We only advertise aircraft we actually own and have in stock.

**AIRCRAFT** *Finance* — We will finance the purchase of any aircraft we sell.

**BUSINESS** *Aviation* — We offer our impartial advice in this field to would-be executive aircraft operators, whether companies or private individuals. Since we stock all models of executive planes, we do not try to sell one particular type.

**AIRCRAFT** *Spares* — Our organization is backed by a 10,000 sq. ft. warehouse at Southend which stocks a large selection of spares for DC4, Viking and Viscount aircraft and a 7 days per week service is operated.

**Keegan Aviation LTD**

**PANSHANGER AERODROME HERTFORD.**
PHONE: ESSENDON 491-2-3.
CABLES: PLANESALES, HERTFORD. TELEX 1943

**ASSOCIATED COMPANIES**

T. D. Keegan Ltd. Airline Air Spares Ltd. Aircraft Air Spares Ltd.
Bembridge Air Hire Ltd. Trans World Leasing Ltd. Keystone (Southend) Finance Co., Ltd.
Panavia Ltd. (Switzerland)

# TITANINE AIRCRAFT FINISHES ARE USED EXCLUSIVELY ON THE NEW AUSTER AIREDALE

TITANINE FINISHES

SPECIAL FINISHES FOR EXECUTIVE AIRCRAFT — USED THROUGHOUT THE WORLD

TITANINE LIMITED · COLINDALE · LONDON · N.W.9 · TELEPHONE: COLINDALE 8123 (6 LINES) · ASSOCIATED COY.: TITANINE INC. · NEW JERSEY · U.S.A.
PIONEERS IN THE DEVELOPMENT OF FINISHES FOR CIVIL, MILITARY AND PRIVATE AIRCRAFT SINCE 1911

# *Executive and Personal Aircraft . . . .*

(*Continued from page 498*)

was joined late last year by a new factory at Vero Beach, Fla., where the new PA-28 Cherokee is being produced. The four-seat all-metal Cherokee has replaced the Tri-Pacer in production, and marks the change in Piper policy towards the low-wing layout for all its aircraft. The high-wing Cub, veteran of some 30 years of production, is to continue in its 95-b.h.p. Continental- and 150-b.h.p. Lycoming-engined versions, as is the compact PA-22-108 Colt, the two-seat very low-cost development of the Tri-Pacer. The Colt has set a new standard in light aircraft production with its basic price of slightly less than $5,000, which compares with $7,500 for the utility Cub. About 500 Colts have already been ordered, and first-year production will total some 1,100. This is about three times the number originally planned.

For a similar price to the former Tri-Pacer, the $9,995 Cherokee will offer better value, with a faster cruise (130 m.p.h.), better all-round performance and economy, and low-wing visibility and ground stability. Its all-metal structure has about 1,200 parts compared with over 1,600 for the Tri-Pacer.

Apart from its fixed nosewheel undercarriage, the Cherokee bears a general similarity in outline to the highly successful Piper PA-24 Comanche, of which production continues with either the 180-b.h.p. or 250-b.h.p. Lycoming engines. Some remarkable flights were achieved in Comanches of both types by Max Conrad last year. He flew non-stop, with considerable extra internal fuel, from Casablanca, Morocco, to Los Angeles, a distance of 7,668 miles, in 58 hr. 38 min. in a PA-24-250, for a new World's Class C-1-d distance record. He set up a 6,921-mile closed-circuit record in the same Comanche with a 180-b.h.p. engine, having also flown it earlier from Casablanca to Texas, a distance of 6,967 miles.

The 1961 Comanches have a new instrument panel, with centre-mounted radio, toe brakes in addition to the central hand brake, new cabin heating, ventilating and exhaust systems, provision for a three-axis autopilot and for the new AutoNav ADF. As the remaining single-engine Piper type, production is continuing with the PA-25 Pawnee for specialized agricultural duties.

In the twin-engined field, Piper is producing the PA-23-160 Apache G, and the PA-23-250 Aztec. The Apache G has additional rear windows for the optional fifth seat, a new rudder control linkage system to reduce pedal loads on the ground and in flight, a new ventilating system, higher generator capacity, improved carb. heat adjustment and higher undercarriage and flap limit speeds. The higher-powered Aztec is a full five-seater, with baggage and radio for long-range operation.

In one of these latter aircraft Max Conrad, accompanied by an official observer, flew 25,457 miles round the World in March, in 8 days 18 hr. and 49 min. For the flight, ferry tanks were installed to increase the normal fuel tankage from 144 to about 400 U.S. gallons.

Future developments from Piper are principally concerned at the moment with the PA-29 Papoose, a two-seat side-by-side replacement for the Colt, fabricated almost entirely of reinforced plastic. If successful, its constructional technique could result in a new approach to low-cost production.

U.K. distributors for Piper in the U.K. are Vigors Aviation, Ltd., Oxford Airport, Kidlington, and authorized dealers include Oxford Aviation Co., Ltd., Oxford Airport (sole sales agents, Oxford to the Scottish border), and Anthony Crook Motors, Hersham, Surrey.

Lowest price two-seater currently produced in the United States, the Piper Colt sells for just under $5,000.

The first Piper Cherokee four-seater, which has replaced the Tri-Pacer in production, is expected in England in the near future.

Five of the nine Apache Gs for the Hamble College of Air Training arrived at Gatwick last week, and are seen with their ferry crews.

**PUTZER.** A wooden two-seater with a strut-braced high wing, the Pützer Elster B is powered by a 95-b.h.p. Continental C-90 engine, and has a fixed nosewheel undercarriage.

Agents in the U.K. are Flair-Aviation Sales, Tower House, College Road, Bromley, Kent.

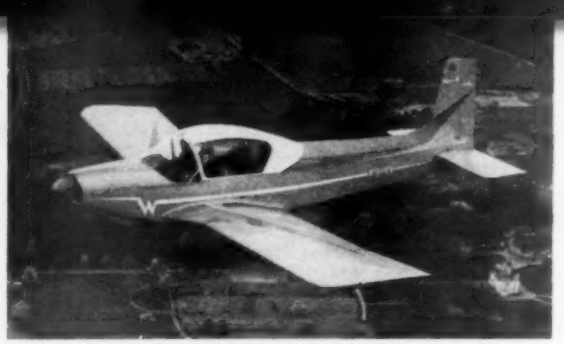
A two-seater from Germany is the Pützer Elster B.

**ROLLASON AIRCRAFT AND ENGINES, LTD.** Manufacture of light aircraft was begun by this Croydon repair and overhaul company in 1957, with production of the Druine Turbulent, which is now offered with coupé canopy, spats, brakes and radio. A Rollason Turbulent, flown by Sqn. Ldr. John Severne, won last year's King's Cup air race. Rollason also specializes in the reconstruction and overhaul of Tiger Moths, and has modified several of these biplanes with inverted fuel and oil systems for aerobatic use. A longer-term project is construction of the Druine Condor two-seater, fitted initially with a Continental A-80 engine, derated to 75 b.h.p. to operate within the ultra-light Permit-to-Fly system. Production plans for the Rollason Condor, renamed the Tutor, envisage the installation of the Continental C-90 or O-200A engines. Rollasons are also U.K. agents for the S.A.N. Jodel Ambassadeur and Mousquetaire.

**S.F.E.R.M.A.** In October, 1959, this French repair and overhaul company undertook to install two Astazou turboprops in a Beech Travel Air placed at its disposal by the Beech Corporation. The Turbo Travel Air made its first flight in July, 1960, and its success was such that S.F.E.R.M.A. continued with the conversion of two Beech Baron airframes with more powerful Astazous. Production examples of the Astazou-Baron are to be known as the S.F.E.R.M.A. Marquis, and eight more airframes are being converted at St. Nazaire, for definite orders. In place of the 250-b.h.p. piston-engines of the Baron are installed 470-e.h.p. Turboméca Astazous, and wing-tip tanks increase the fuel capacity from 143 to 169 Imp. gal. Gross weight is increased from 5,090 to 5,400 lb., and the cruising speed from 220 to 270 m.p.h. The Astazous have a high degree of automaticity in engine handling, and, with reversible-pitch airscrews, offer remarkably short landing distances.

Fuel capacity in the 1961 Piper Comanche 250 permits an economy cruise for more than 12 hr. for a range of over 1,600 miles.

The French Jodels have remarkable load-carrying capabilities, and the little Ambassadeur can lift up to four people on 100 b.h.p.



A fast four-seater tourer is the French Wassmer Super IV.

Prototype of the Astazou-powered Turbo-Travel Air has been succeeded by conversions of the Beech Baron, designated the Marquis.

## *Executive and Personal Aircraft . . . .*

**SHINN ENGINEERING INC.** This company has taken over sales and development of the two-seat Morrisey 2150 all-metal trainer and utility monoplane, which was built in small numbers in 1958-59. By removing the rear seat and rear controls, more than 300 lb. of freight may be carried. The steerable nosewheel undercarriage is non-retractable.

**L. B. SMITH AIRCRAFT CORPORATION.** Two versions of the Douglas B-26 converted for executive transport have been produced by this Miami, Fla., company. They are the unpressurized Tempo I, and the high-altitude Tempo II. Flight and cabin have been completely redesigned, with dual controls for the crew of two and accommodation for up to 10 passengers in the reworked rear fuselage. Air stairs have been built in the port side, aft of the wings, which have had the usual rear spar removal of B-26 conversions, in the centre-section, and its replacement by a strengthened fuselage pick-up. Wing-tip tanks bring the total fuel capacity to 1,170 U.S. gal.

**SOCIETE DES AVIONS JODEL.** Various types in the cranked-wing Jodel series are being manufactured by a number of aircraft companies in France, Germany, Italy, Spain and elsewhere and also by amateur constructors. The Jodel company has manufactured a large number of kits of parts for the D.9, D.11 and D.112, while other French production comprises Alpavia (2-seat D.117), Centre Est Aéronautique (2/3-seat DR 1050 Ambassadeur), E.A.C. (2-seat D.127 and D.128), Société Aéronautique Normande (DR 100 Ambassadeur and 5-seat D.140 Mousquetaire) and Société Wassmer (2-seat D.120). Marketed in the U.K. are the 3/4-seat S.A.N. Ambassadeur and the 4/5-seat Mousquetaire, both of wooden construction and with an excellent speed range.

Agents are Rollason Aircraft and Engines, Ltd., Croydon Airport, Surrey.

**SOCIETE DES ETABLISSEMENTS WASSMER.** From the licensed construction of wooden Jodel light aircraft, of which nearly 400 D.112s and D.120s had been produced by the end of 1960, Wassmer has graduated to the production of its own Super IV four-seat tourer, embodying many transatlantic ideas. The prototype Super IV first flew on Jne. 8, 1959, deliveries starting a year later. The Super IV utilizes a steel-tube fuselage and wooden mainplanes, and the nosewheel undercarriage is manually retractable. A slab-type tailplane is fitted, and other features include a sliding bubble canopy and exhaust ejector cooling. Seventeen have been built to date.

U.K. representative for the Super IV is H. Best-Devereux, Flat Six, 22 Hall Drive, London, S.E.26.

**SVENSKA AEROPLAN A.B.** Since production began in 1946 with the SAAB Safir, well over 300 examples of this aerobatic four-seater have been delivered, and production is continuing with the SAAB-91D. This first appeared in 1957, with the new and lighter Lycoming O-360 engine, constant-speed airscrew, new brakes, rudder trim and other improvements. Most Safirs are used for civil and military training, but the type has also been sold as a private and executive aircraft in 12 countries.

**SWISS AMERICAN AVIATION CORPORATION.** Mr. William P. Lear, chairman of Lear, Inc., electronics company, is directing the design of a light, low-cost (£90,000) executive jet aircraft, the SAAC 23. Conforming to the now accepted fuselage-mounted jet layout, the SAAC 23 is designed for a 500 m.p.h. cruising speed at 90% max. continuous thrust at 30,000 ft., over ranges of less than 1,000 miles. This distance is said to comprise 90% of all business flights. The SAAC 23 is dimensionally small, spanning 33 ft., with a length of 37 ft., but will accommodate up to seven passengers and 260 lb. of baggage in its pressurized cabin. It is designed for operation by well-qualified private pilots over a max. range of 2,270 miles, and, with a gross weight of 11,200 lb., will have an initial climb of 6,000 ft. /min. Equipment will include as standard a three-axis Lear autopilot, emergency oxygen, electric de-icing and jet-blast screen rain removal. The first two aircraft are to be assembled in Switzerland, with initial completion in December, 1961, but subsequent airframes will be shipped to the U.S. for installation of their General Electric CJ610-2B turbojets.

**TRANS-FLORIDA AVIATION, INC.** One of the more unusual executive aircraft is the TFA Cavalier 2000, which is a converted F-51D Mustang fighter. Relocation of the original equipment leaves sufficient room in the cockpit for two seats in tandem, with baggage accommodation in the former gun bays in the wings. The cleaner airframe of the civilianized Mustang adds about 20 m.p.h. to the performance of the former fighter, and with its 80 Imp. gal. wing-tip tanks, in addition to internal fuel, the Cavalier combines cruising speeds of up to 400 m.p.h. with an operating range approaching 2,000 miles. It costs the equivalent of only £16,000, with full airline-standard radio and navigational aids in the revised cockpit.

**UMBAUGH AIRCRAFT CORPORATION.** The large-scale production plans for the Umbaugh Model 18 two-seat jump-start autogyro do not so far seem to have materialized, although five prototypes are reported to have been built and flown.

U.K. agents are Holman and Co. (Engineers), Ltd., 183 Fordneuk Street, Glasgow, S.E.

**VICTA CONSOLIDATED INDUSTRIES PTY., LTD.** This company was established at Milperra, N.S.W., Australia, to produce light aircraft in the sub-continent, starting with the two-seat Millicer Air Tourer. A wooden prototype of this aerobatic two-seater first flew on Apr. 10, 1959, powered by a 65-b.h.p. Continental engine, but production versions are being built of metal, with the 95-b.h.p. Continental engine. Orders reported for nearly 40 Air Tourers, including six for Auckland Aero Club, New Zealand, from an initial production batch of 50. Also under development at VCI is the four-seat R-2 executive type, designed by Mr. Luigi Pellarini, and having a retractable tricycle undercarriage.

**WILTSHIRE SCHOOL OF FLYING.** Interest in manufacture by this Thruxton, Wilts, club organization extends to the production of the Jackaroo conversion of the Tiger Moth, and the development of the Tutor and Paragon aerobatic light aircraft. Many Tiger Moths have now undergone the Jackaroo conversion to this four-seat cabin layout, and about 10 are in hand for an Indian order. Kits of parts are being supplied by the Wiltshire School for assembly in India, where the Jackaroos will be used for a joint club and crop-spraying rôle. The E.S.1 Tutor two-seater and the four-seat E.S.2 Paragon have been developed to M.o.A. specifications for low-cost production, using Warren girder fuselage construction and American powerplants.

Yet another B-26 conversion is the L.B. Smith Tempo II, which is pressurized for executive use.

## PRINCIPAL EXECUTIVE AND PERSONAL AIRCRAFT OF THE WORLD—TABLE I

| Aircraft | Powerplant | Seats | Span | Length | Wing area | Empty wt. | Gross wt. | Cruise performance | | | | | Cons. A.M.P.G. | Initial climb | Service ceiling | T.o. to 50 ft. | Ldg. from 50 ft. | Basic cost | Op. costs | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | % Power | Height | Speed | Range | Fuel | | | | | | | Per hr. | Annual util. | Per seat/m. |
| | | | ft. in. | ft. in. | sq. ft. | lb. | lb. | | ft. | m.p.h. | st. miles | Imp. gal. | | ft./min. | ft. | ft. | ft. | | | hr. | |
| **AUSTRALIA** | | | | | | | | | | | | | | | | | | | | | |
| DHA–3 Drover Mk. 4 | 3×180 H.P. Lycoming O–360–A1A | 8 | 57 0 | 36 6 | 325 | 4,500 | 6,500 | 70 | 5,000 | 135 | 600 | 132 | 6.4 | 1,040 | 18,000 | 750 | 1,750 | £A25,000 | N.A. | N.A. | N.A. |
| Victa Air Tourer | 1×90 H.P. Continental C–90 | 2 | 26 0 | 20 9 | 120 | 750 | 1,500 | N.A. | N.A. | 120 | 600 | 24.5 | 25 | 900 | N.A. | N.A. | N.A. | g£A3,750 | N.A. | N.A. | N.A. |
| Victa R–2 | 1×180 H.P. Lycoming O–360–A1A | 4 | 32 0 | 21 6 | 132 | 1,109 | 2,250 | 75 | 5,000 | 175 | 800 | 40 | 20 | 1,160 | 16,600 | N.A. | N.A. | g£A8,500 | N.A. | N.A. | N.A. |
| **AUSTRIA** | | | | | | | | | | | | | | | | | | | | | |
| Oberlerchner Job 5 | 1×140 H.P. Lycoming O–290–D2B | 3 | 33 1 | 24 7 | 158 | 1,036 | 1,852 | N.A. | N.A. | 121 | 609 | 28 | 22 | 748 | 15,419 | 1,312 | *b*492 | N.A. | N.A. | N.A. | N.A. |
| Simmering Graz-Pauker M.222 | 2×150 H.P. Lycoming O–320–A | 4 | 36 1 | 28 10 | 184 | 2,535 | 3,858 | 75 | N.A. | 168 | 810 | 57 | 14.2 | 1,380 | 21,000 | 1,870 | *b*660 | N.A. | N.A. | N.A. | N.A. |
| **BELGIUM** | | | | | | | | | | | | | | | | | | | | | |
| Fairey Tipsy Nipper T.66/2 | 1×45 H.P. Stark Stamo 1400A | 1 | 19 8 | 15 0 | 80.7 | 412 | 660 | 83 | S.L. | 94 | 260 | 7.5 | 33 | 630 | 10,800 | 1,112 | 1,500 | *a*£1,275 | £1.5 | 300 | 3d. |
| **BRITAIN** | | | | | | | | | | | | | | | | | | | | | |
| Auster-Beagle A.109 Airedale | 1×180 H.P. Lycoming O–360–A1A | 4 | 36 0 | 26 4 | 184.5 | 1,630 | 2,750 | N.A. | 5,000 | 132 | 850 | 52 | 19.5 | 730 | 15,000 | 1,650 | N.A. | £4,750 | N.A. | N.A. | N.A. |
| Auster-Beagle A.61 Terrier | 1×145 H.P. Gipsy Major 10 | 2/3 | 36 0 | 23 3 | 184 | 1,430 | 2,200 | N.A. | 1,000 | 110 | 385 | 22 | 17.5 | 810 | 14,000 | 700 | N.A. | £1,995 | N.A. | N.A. | N.A. |
| Avro 748X Executive | 2×2,105 E.S.H.P. Dart Mk. 531 | 8/20 | 95 0 | 67 0 | 795 | 18,000 | 36,000 | — | 25,000 | 302 | *c*2,300 | 1,367 | 1.6 | 1,600 | 29,000 | 2,520 | 2,310 | g£250,000 | — | — | — |
| De Havilland Dove 8 | 2×400 H.P. Gipsy Queen 70 Mk. 3 | 7 | 57 0 | 39 3 | 335 | 6,325 | 8,950 | 60 | 8,000 | 184 | 644 | 168 | 6.77 | 1,135 | 21,700 | 1,740 | 1,800 | £35,900 | £26.12 | 750 | 7d.(6) |
| De Havilland Heron 2 | 4×250 H.P. Gipsy Queen 30 Mk. 2 | 10 | 71 6 | 48 6 | 499 | 8,484 | 13,500 | 65 | 8,000 | 183 | 1,500 | 416 | 3.8 | 1,075 | 17,200 | *d*2,425 | 2,065 | £63,000 | £41 | 726 | 5.49d. |
| De Havilland D.H. 125 | 2×3,240 lb. B–S Viper 20 | 8 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Hampshire Aero Club Wot | 1×60 H.P. Walter Mikron | 1 | 22 1 | 18 3 | 150 | 455 | 720 | 70 | 1,500 | 80 | 250 | 11 | 22.7 | 690 | 12,000 | 600 | 750 | £1,200 | £1.8 | 100 | 5.2d. |
| Hampshire B.H. 1 Halcyon | 1×145 H.P. Gipsy Major 10 | 4 | 31 4 | 23 6 | 154 | 1,040 | 2,000 | 75 | 5,000 | 150 | 900 | 54 | 16.5 | 1,700 | 27,000 | 1,000 | N.A. | £5,000 | N.A. | N.A. | N.A. |
| Lancashire A.C. Prospector I | 1×295 H.P. Lycoming GO–480 | 6 | 43 6 | 29 9 | 227.6 | 2,072 | 3,700 | 70 | 2,000 | 120 | 580 | 56 | 10.3 | 960 | 12,500 | 1,065 | 1,005 | £9,360 | £8.73 | 1,000 | 2d. |
| Phoenix Luton Minor | 1×37 H.P. Aeronca-Jap J.99 | 1 | 25 0 | 20 9 | 125 | 390 | 650 | 88 | 1,000 | 70 | 200 | 6.5 | 30 | 420 | 8,000 | *b*240 | *b*120 | £895 | N.A. | N.A. | N.A. |
| Phoenix Luton Major | 1×60 H.P. Walter Mikron II | 2 | 35 2 | 23 9 | 163 | 600 | 1,100 | 75 | 1,000 | 95 | 300 | 11 | 27 | 700 | N.A. | *b*240 | *b*150 | £1,958 | N.A. | N.A. | N.A. |
| Rollason Turbulent | 1×40 H.P. Ardem 4CO2 (FH Mod.) | 1 | 21 7 | 17 6 | 77.5 | 350 | 620 | N.A. | 2,000 | 85 | 300 | 8.5 | 35 | 700 | N.A. | 700 | 600 | £1,040 | £1.2 | 200 | 3.5d. |
| Scottish Aviation Twin Pioneer 3 | 2×600 H.P. Leonides 531/8B | 12 | 76 6 | 45 3 | 670 | 10,287 | 14,600 | 50 | 5,000 | 131 | 670 | 247 | 2.7 | 920 | 18,000 | 1,100 | 1,030 | g£63,000 | £21 | 1,500 | 2.8d.(16) |
| Vickers Viscount 810 | 4×1,990 E.H.P. Dart 525 | *h*40 | 93 11 | 85 8 | 963 | 43,500 | 72,500 | N.A. | 22,000 | 348 | 2,160 | 2,420 | .893 | 1,420 | 30,000 | 6,150 | 4,500 | $1.5m. | *f*$328 | 1,000 | 2–20d. |
| Westland Widgeon | 1×500 H.P. Leonides 521/2 | *h*5 | °49 2 | †41 3 | — | 4,322 | 5,900 | N.A. | 1,000 | 81 | 310 | 83.2 | 3.7 | 780 | 12,000 | 0 | 0 | £26,000 | *f*£30 | 1,000 | 22.2d. |
| Wiltshire Flying School Jackaroo | 1×130 H.P. Gipsy Major 1 | 4 | 30 4 | 25 0 | 246.7 | 1,378 | 2,190 | N.A. | — | 92 | 250 | 19 | 13.2 | 600 | N.A. | 850 | 1,450 | £1,470 | ‡£3 | 400 | 2d. |
| E.S.1 Tutor | 1×140 H.P. Lycoming O–290–D2B | 2 | 30 0 | 24 0 | 143 | 1,232 | 1,700 | 70 | N.A. | 110 | 330 | 25 | 13.2 | 900 | N.A. | 750 | N.A. | ‡£2,200 | N.A. | N.A. | N.A. |
| E.S.2 Paragon | 1×180 H.P. Lycoming O–360–A1A | 4 | 36 0 | 26 0 | 176 | 1,300 | 2,500 | 70 | N.A. | 120 | 600 | 60 | 10 | 850 | N.A. | 900 | N.A. | ‡£2,500 | N.A. | N.A. | N.A. |
| **CANADA** | | | | | | | | | | | | | | | | | | | | | |
| Found FBA–2B | 1×250 H.P. Lycoming O–540–A1D | 4/5 | 36 0 | 25 6 | 180 | 1,550 | 2,850 | 60 | 5,000 | 120 | 610 | 56 | 11.8 | 1,190 | 16,000 | 880 | N.A. | N.A. | N.A. | N.A. | N.A. |
| Fleet 80 Canuck | 1×90 H.P. Continental C–90–12F | 2 | 34 0 | 22 4 | 173.5 | 865 | 1,500 | 66 | — | 100 | 350 | 16 | 22 | 600 | 12,000 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. |
| **CZECHOSLOVAKIA** | | | | | | | | | | | | | | | | | | | | | |
| Aero 145 | 2×140 H.P. Walter M332 | 4 | 45 4½ | 24 9 | 184 | 2,266 | 3,520 | 65 | 4,000 | 150 | 1,000 | 70 | 14.3 | 985 | 18,530 | *b*705 | *b*754 | *a*£11,850 | N.A. | N.A. | N.A. |
| L–40 Meta-Sokol | 1×140 H.P. Walter M332 | 4 | 32 10 | 24 10 | 156 | 1,177 | 2,059 | 65 | 4,000 | 127 | 670 | 24.2 | 28 | 900 | 16,400 | 1,590 | 1,722 | *a*£4,800 | N.A. | N.A. | N.A. |
| Morava L.200A | 2×210 H.P. Walter M337 | 5 | 39 4½ | 28 2½ | 186 | 2,645 | 4,232 | 75 | 8,200 | 180 | 1,025 | 92 | 11.2 | 1,260 | 18,700 | 1,263 | 1,960 | *a*£18,600 | N.A. | N.A. | N.A. |
| Zlin Z.326 | 1×210 H.P. Walter M337 | 2 | 34 8 | 25 8 | 166 | 1,404 | 1,984 | N.A. | N.A. | 131 | 403 | N.A. | N.A. | N.A. | 15,747 | 820 | 508 | *a*£6,500 | N.A. | N.A. | N.A. |
| **FRANCE** | | | | | | | | | | | | | | | | | | | | | |
| Dassault Communauté | 2×1,000 S.H.P. Turbomeca Bastan | 8–10 | 54 8 | 50 6 | — | 15,432 | — | — | — | 335 | 1,800 | 574 | 4 | 2,165 | 30,510 | 1,558 | N.A. | g$500,000 | — | — | — |
| Druine D.62 Condor | 1×90 H.P. Continental C–90 | 2 | 30 2 | 21 6 | 134.5 | 683 | 1,200 | N.A. | N.A. | 121 | 435 | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. |
| Druine D.5 Turbi | 1×45 H.P. Beaussier | 2 | 28 6 | 22 6 | 139 | 610 | 1,090 | N.A. | N.A. | 74.5 | 400 | N.A. | N.A. | 492 | 9,000 | *b*525 | *b*295 | N.A. | N.A. | N.A. | N.A. |
| Fournier RF–01 | 1×25 H.P. Volkswagen | 1 | 36 9 | 19 4 | 118 | 496 | 772 | N.A. | 2,500 | 93 | 300 | N.A. | N.A. | 490 | N.A. | *b*460 | N.A. | N.A. | N.A. | N.A. | N.A. |
| Gardan Gy–80 | 1×150 H.P. Lycoming O–320–A | 4 | 31 9 | 21 6 | 140 | 1,208 | 2,205 | 66 | 6,560 | 149 | 714 | 33 | 22 | 886 | N.A. | 1,215 | N.A. | NF50,000 | N.A. | N.A. | N.A. |
| Jodel DR.100 Ambassadeur | 1×100 H.P. Continental O–200–A | 3/4 | 28 8 | 21 6 | 145.8 | 882 | 1,650 | 75 | 3,000 | 120 | 650 | 25 | 26.6 | 600 | 13,000 | 900 | 460 | *a*£2,800 | £3.6 | 200 | 3d. |
| Jodel D.140 Mousquetaire | 1×180 H.P. Lycoming O–360 | 4/5 | 33 6 | 25 11 | 192.7 | 1,320 | 2,535 | 75 | 5,000 | 140 | 800 | 48 | 17.5 | 980 | 15,000 | 690 | 600 | *a*£4,500 | £4.5 | 200 | 2d. |
| Morane-Saulnier M.S. 880 Rallye-Club | 1×100 H.P. Continental O–200–A | 2/3 | 31 6 | 23 0 | 132.5 | 1,003 | 1,703 | N.A. | N.A. | 106 | 500 | 21.6 | 25 | 512 | 11,300 | *b*722 | *b*295 | *a*£2,450 | £3 | 400 | N.A. |
| M.S. 885 Super-Rallye | 1×145 H.P. Continental O–320–A | 3/4 | 31 6 | 23 0 | 132.5 | N.A. | 2,200 | N.A. | N.A. | 130 | 700 | 36.6 | 19.7 | 1,013 | 15,100 | *b*394 | *b*328 | *ag*£3,500 | £5 | 400 | N.A. |
| M.S. 760 Paris II | 2×1,058 lb. Marboré | 4 | 33 3 | 33 0 | 193.7 | — | — | — | — | — | — | — | — | — | — | — | — | N.A. | N.A. | N.A. | N.A. |
| Piel/Scintex Emeraude | 1×95 H.P. Continental C–90–14F | 2 | 27 0 | 20 0 | 118.4 | 875 | 1,433 | 75 | S.L. | 112 | 621 | 26.3 | 23.6 | 590 | 13,123 | 918 | 754 | *a*£2,392 | N.A. | N.A. | N.A. |
| Potez-Heinkel CM–191 | 2×1,058 lb. Marboré VI | 4 | — | — | — | — | 8,157 | — | — | 434 | 932 | — | — | — | — | — | — | — | — | — | — |
| S.F.E.R.M.A. Marquis | 2×470 E.H.P. Astazou | 5 | 37 10 | 25 4 | 199.2 | 3,000 | 5,400 | N.A. | 15,000 | 270 | *c*810 | 170 | 6 | 3,150 | 27,000 | 490 | 655 | N.A. | N.A. | N.A. | N.A. |
| S.I.P.A. 272 Presence | 2×546 H.P. Astazou II | 12 | 57 1 | 45 7 | 355 | 6,953 | 10,736 | N.A. | 20,000 | 240 | 1,550 | 330 | 5 | 1,600 | N.A. | *k*1,755 | *k*1,720 | N.A. | N.A. | N.A. | N.A. |
| S.R.C.M. Joigny | 1×150 H.P. Continental O–320–A | 3/4 | 27 4½ | 21 0 | 113 | 1,410 | 2,315 | N.A. | N.A. | 177 | 930 | 53 | 17.5 | 790 | 19,030 | *b*985 | *b*460 | N.A. | N.A. | N.A. | N.A. |
| Wassmer Super IV | 1×180 H.P. Lycoming O–360–A1A | 4 | 32 9 | 24 11 | 172 | 1,433 | 2,645 | 75 | 7,500 | 165 | 810 | 50 | — | 900 | 18,040 | *b*655 | *b*590 | — | — | — | — |
| **GERMANY** | | | | | | | | | | | | | | | | | | | | | |
| Blume Bl 502 | 1×150 H.P. Lycoming O–320–A | 4 | 34 5 | 26 9 | 161.5 | 1,478 | 2,470 | 70 | N.A. | 137 | 560 | N.A. | N.A. | 1,005 | 15,750 | 1,230 | N.A. | N.A. | N.A. | N.A. | N.A. |
| Bölkow/Klemm Kl 107C | 1×150 H.P. Lycoming O–320–A2A | 3 | 35 6½ | 27 3 | 157 | 1,377 | 2,137 | 65 | 3,280 | 115 | 522 | 30 | 17.5 | 900 | 14,000 | 1,310 | 1,150 | eDM42,900 | *g*£4 | 500 | 4d. |
| Bölkow F.207 | 1×180 H.P. Lycoming O–360–A1A | 4 | 35 5 | 27 2 | 165 | 1,545 | 2,645 | 65 | 3,280 | 143 | 800 | 44 | 18.2 | 1,000 | 16,400 | 1,475 | 1,310 | eDM54,500 | *g*£5 | 400 | g4–5d. |
| Dornier Do 27H2 | 1×340 H.P. Lycoming GSO–480–B1B | 6 | 39 5 | 32 5 | 209 | 2,596 | 4,070 | N.A. | 8,200 | 146 | 590 | 48.4 | 10.5 | 950 | 24,600 | *b*590 | 640 | N.A. | N.A. | N.A. | N.A. |
| Do 27Q | 1×275 H.P. Lycoming GO–480–B1A | 6 | 39 5 | 31 6 | 209 | 2,310 | 4,080 | 65 | 8,000 | 122 | 610 | 48.4 | 12.6 | 670 | 935 | 935 | 640 | *a*£12,815 | £23.54 | 300 | N.A. |
| Do 28 | 2×250 H.P. Lycoming O–540–A1A | 6 | °45 3½ | 29 8 | 263 | 3,615 | 5,137 | 75 | 6,560 | 161 | 660 | 105 | 6.2 | 1,378 | 20,500 | 902 | 715 | *a*£21,785 | £24.24 | 500 | N.A. |
| Pützer-Elster | 1×95 H.P. Continental C–90–12F | 2 | 43 4 | 23 3 | 188.4 | 1,014 | 1,543 | N.A. | N.A. | 93 | 280 | 14 | 20 | 720 | 16,400 | 787 | 623 | g£2,900 | N.A. | N.A. | N.A. |
| Rhein-Flugzeugbau R.W.3–A3 | 1×75 H.P. Porsche 678/4 | 2 | 34 2 | 24 4 | 150.7 | 1,212 | 1,940 | 73 | N.A. | 112 | 520 | 17.6 | 37 | 490 | 14,770 | *b*780 | *b*240 | *ag*£3,200 | N.A. | N.A. | N.A. |
| Scheibe Sperling SF–23C | 1×115 H.P. Lycoming O–235–C1 | 2 | 32 6 | 20 5 | 131 | 1,058 | 1,610 | 60 | N.A. | 105 | 394 | 17.2 | 22.3 | 785 | 18,000 | 1,380 | 1,050 | *a*£2,850 | N.A. | N.A. | N.A. |
| **ITALY** | | | | | | | | | | | | | | | | | | | | | |
| Aeromere Falco F.8L | 1×150 H.P. Lycoming O–320 | 2 | 26 3 | 21 4 | 107.5 | 1,147 | 1,720 | N.A. | 7,000 | 162 | 700 | 26 | 27 | 1,070 | 19,000 | 1,590 | 1,345 | *a*£4,700 | N.A. | N.A. | N.A. |
| Avia Milano P.19 | 1×95 H.P. Continental C–90 | 2 | 33 7 | 22 11 | 150.7 | 882 | 1,543 | N.A. | N.A. | 111 | 747 | 16 | 30 | 750 | 13,500 | 853 | *b*425 | N.A. | N.A. | N.A. | N.A. |
| Avia Milano F.14 Nibbio | 1×180 H.P. Lycoming O–360–A1A | 4 | 31 1½ | 23 9½ | 139 | 1,500 | 2,535 | 65 | N.A. | 177 | 880 | 45.7 | 22 | 1,181 | 17,700 | 1,080 | *b*490 | *ag*£6,600 | N.A. | N.A. | N.A. |

* Rotor diameter; † Fuselage length; ‡ Estimated; *a* Including U.K. duty 17½%; *b* Ground run; *c* IFR stage length; *d* Airline method; *e* FAF price; *f* Includes crew pay; *g* Approximately; *h* Typical executive conversion; *j* Including full radio; *k* Field length; *l* On airfield; *m* In standard form; *n* Direct Operating Cost; *p* From IFR-equipped first cost; *q* Including allowances and 45 min. reserve; *r* 7-year depreciation; *s* 10-year depreciation.

# PRINCIPAL EXECUTIVE AND PERSONAL AIRCRAFT OF THE WORLD—TABLE 2

| Aircraft | Powerplant | Seats | Span | Length | Wing area | Empty wt. | Gross wt. | Cruise performance | | | | | Cons. A.M.P.G. | Initial climb | Service ceiling | T.o. to 50 ft. | Ldg. from 50 ft. | Basic cost | Op. cost | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | % Power | Height | Speed | Range | Fuel | | | | | | | Per hr. | Annual util. | Per seat/m. |
| | | | ft. in. | ft. in. | sq. ft. | lb. | lb. | | ft. | m.p.h. | st. miles | Imp. gal. | | ft./min. | ft. | ft. | ft. | | | hr. | |
| **Italy contd.** | | | | | | | | | | | | | | | | | | | | | |
| Meteor Super F.L.55 D.M. | 1×180 H.P. Meteor G 180 CA | 4 | 32 2 | 20 10 | 155 | 1,102 | 1,984 | N.A. | N.A. | 118 | 472 | N.A. | N.A. | 885 | 26,240 | *b*395 | *b*330 | N.A. | N.A. | N.A. | N.A. |
| Nardi FN–333 Riviera | 1×260 H.P. Continental IO–470–H | 4 | 34 0 | 24 3 | 163 | 2,137 | 3,270 | 65 | 9,000 | 159 | 1,025 | 54 | 19 | 1,280 | 19,000 | *b*925 | N.A. | N.A. | N.A. | N.A. | N.A. |
| Partenavia P.57 Fachiro | 1×168 H.P. Lycoming O–360 | 4 | 30 0 | 21 11 | 144.2 | 1,367 | 2,315 | N.A. | N.A. | 125 | 528 | 35 | 16.7 | 944 | 14,760 | 1,470 | *b*393 | N.A. | N.A. | N.A. | N.A. |
| Piaggio P.136L–1 | 2×270 H.P. Lycoming GO–480–B | 5 | 44 5 | 35 5 | 270 | 4,400 | 5,996 | 70 | 9,000 | 167 | 769 | 158.4 | 5.5 | 1,180 | 19,685 | *l*1,380 | *l*1,700 | *a*£22,000 | N.A. | N.A. | N.A. |
| P.166 Executive | 2×340 H.P. Lycoming GSO–480–B1C6 | 8 | 46 9 | 38 1 | 286 | 5,070 | 8,115 | 75 | 12,800 | 207 | 1,066 | 198 | 5.4 | 1,240 | 25,500 | 1,900 | 1,560 | *a*£40,537 | *f*£26.29 | 600 | *f*4.68d.(7) |
| Procaer Cobra 400 | 1×880 lb. Marboré II | 2 | 28 6 | 25 7 | 131.5 | 1,543 | 2,866 | N.A. | 13,100 | 310 | 620 | 70 | 8.8 | N.A. | 31,200 | *b*985 | *b*625 | N.A. | N.A. | N.A. | N.A. |
| Picchio F.15A | 1×180 H.P. Lycoming O–360–A1A | 4 | 30 7 | 24 7 | 131.5 | 1,345 | 1,785 | 75 | 8,200 | 174 | 761 | 43.2 | 21 | 1,000 | 19,200 | 1,380 | 1,320 | $22,300 | N.A. | N.A. | N.A. |
| **POLAND** | | | | | | | | | | | | | | | | | | | | | |
| P.Z.L.–102B KOS | 1×95 H.P. Continental C–90–12F | 2 | 27 9 | 22 10 | 118.6 | 890 | 1,390 | 72 | 8,200 | 108 | 388 | 21 | 18.5 | 810 | 15,100 | 1,300 | 1,100 | *a*£2,500 | ‡£2.6 | 500 | 2.96d. |
| **SWEDEN** | | | | | | | | | | | | | | | | | | | | | |
| Malmo MFI–Junior | 1×100 H.P. Continental O–200–A | 2 | 23 0 | 18 0 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Saab–91D Safir | 1×180 H.P. Lycoming O–360–A | 4 | 34 9 | 26 4 | 146.3 | 1,550 | 2,657 | 66 | S.L. | 137 | 660 | 35 | 17 | 800 | 16,400 | 2,030 | 1,800 | *a*£7,800 | £6 | 500 | 2.4d. |
| **U.S.A.** | | | | | | | | | | | | | | | | | | | | | |
| Aerocar Model 1 | 1×143 H.P. Lycoming O–320 | 2 | 34 0 | 21 6 | 190 | 1,500 | 2,100 | 70 | 5,000 | 100 | 300 | 20 | 15 | 550 | 11,000 | 1,250 | 720 | $9,995 | N.A. | N.A. | N.A. |
| Aero Commander 500A | 2×260 H.P. Continental IO–470–M | 4/7 | 49 6 | 35 1 | 255 | 4,255 | 6,250 | 55 | 10,000 | 190 | 1,390 | 130 | 10.7 | 1,510 | 23,200 | 1,210 | 1,150 | *a*£28,326 | *s*£21.6 | 600 | *s*4d.(6) |
| 500B | 2×290 H.P. Lycoming IO–540 | 4/7 | 49 6 | 35 1 | 255 | 4,300 | 6,750 | 55 | 9,000 | 195 | 1,350 | 130 | 11.3 | 1,450 | 20,500 | 1,550 | 1,650 | *a*£34,200 | *s*£23.5 | 600 | *s*4.3d.(6) |
| 560 F | 2×350 H.P. Lycoming IGO–540 | 5/7 | 49 6 | 35 1 | 255 | 4,650 | 7,500 | 55 | 10,000 | 207 | 1,700 | 185 | 8.7 | 1,720 | 21,900 | 1,250 | 1,375 | *a*£41,334 | *s*£26 | 600 | *s*4.75d.(6) |
| 680 F | 2×380 H.P. Lycoming IGSO–540 | 5/7 | 49 6 | 35 1 | 255 | 4,800 | 8,000 | 55 | 10,000 | 219 | 1,400 | 185 | 6.5 | 1,660 | 28,500 | 1,380 | 1,330 | *a*£47,630 | *s*£28.1 | 600 | *s*5d.(6) |
| Air Products Aircoupe | 1×90 H.P. Continental C–90 | 2 | 30 0 | 20 2 | 142.6 | 933 | 1,450 | 65 | S.L. | 110 | 500 | 20 | 25 | 780 | 15,500 | *b*500 | *b*600 | *a*£3,575 | £3 | 400 | 3.3d. |
| Allison Super Convair | 2×3,750 S.H.P. Allison 501–D13D | *m*66 | 105 4 | 81 6 | 920 | 33,050 | 53,200 | N.A. | 20,000 | 342 | *q*1,540 | 1,440 | 1.3 | 2,500 | N.A. | *k*4,700 | *k*4,400 | N.A. | N.A. | N.A. | N.A. |
| Beech Model 33 Debonair | 1×225 H.P. Continental IO–470 | 4 | 32 10 | 25 6 | 177.6 | 1,745 | 3,000 | 65 | 11,000 | 180 | *q*900 | 57 | 19 | 960 | 18,400 | 1,235 | 1,282 | *a*£10,172 | £12.5 | 400 | *p*5.7d.(3) |
| Model M35 Bonanza | 1×260 H.P. Continental IO–470 | 4/5 | 33 5 | 25 2 | 181 | 1,872 | 3,125 | 65 | 10,000 | 190 | *q*1,075 | 65 | 19.5 | 1,150 | 19,200 | 1,050 | 840 | *a*£12,185 | £13.9 | 400 | *p*6d.(3) |
| Model B95 Travel Air | 2×180 H.P. Lycoming O–360 | 4/5 | 37 10 | 25 4 | 199.2 | 2,635 | 4,100 | 65 | 10,500 | 195 | *q*980 | 93 | 12.5 | 1,300 | 18,700 | 1,280 | 1,590 | *a*£22,967 | £19 | 400 | *p*6d.(4) |
| Baron | 2×260 H.P. Continental IO–470 | 4/5 | 37 10 | 25 8 | 199.2 | 2,960 | 4,880 | 65 | 10,500 | 216 | *q*1,080 | 117 | 11 | 1,630 | 19,200 | 1,255 | 1,750 | *a*£25,873 | £21.9 | 400 | *p*6.2d.(4) |
| Model D50 Twin-Bonanza | 2×295 H.P. Lycoming GO–480 | 6/7 | 45 11 | 31 6 | 277 | 4,100 | 6,300 | 65 | 9,000 | 201 | *q*935 | 150 | 7.4 | 1,450 | 20,300 | 1,260 | 1,455 | *a*£38,196 | £27 | 400 | *p*6.6d.(5) |
| J50 Twin-Bonanza | 2×340 H.P. Lycoming IGSO–480 | 6/7 | 45 11 | 31 6 | 277 | 4,470 | 7,300 | 65 | 10,000 | 207 | *q*1,225 | 192 | 7.7 | 1,270 | 29,150 | 1,450 | 1,840 | *a*£43,600 | £30.5 | 400 | *p*7.2d.(5) |
| Model 65 Queen Air | 2×340 H.P. Lycoming IGSO–480 | 6/9 | 45 11 | 33 4 | 277 | 4,660 | 7,700 | 65 | 10,000 | 200 | *q*1,070 | 192 | 7.5 | 1,300 | 31,300 | 1,560 | 1,685 | *a*£54,630 | £32 | 400 | *p*7.8d.(5) |
| Super G18S | 2×450 H.P. P&WWasp R–985–AN14 | 7/11 | 49 8 | 35 2 | 360.7 | 5,910 | 9,700 | 66.7 | 5,000 | 204 | *q*1,197 | 265 | 5.5 | 1,410 | 21,600 | 1,980 | 1,850 | *a*£57,732 | £41.5 | 400 | *p*8.3d.(6) |
| Bell Model 47 J-2 Ranger | 1×240 H.P. Lycoming VO–540–B1 | 4 | *37 2 | †32 5 | — | 1,730 | 2,850 | N.A. | N.A. | 81 | 250 | 40 | 6.5 | 800 | 12,100 | 0 | 0 | $71,950 | N.A. | N.A. | N.A. |
| Brantly B–2 | 1×180 H.P. Lycoming VO–360–A | 2 | *23 11 | †19 4 | — | 960 | 1,600 | 78 | — | 100 | 300 | 27 | 12 | 1,580 | 10,000 | 0 | 0 | $19,950 | $18.63 | 500 | ‡$0.103 |
| Cessna Model 150 | 1×100 H.P. Continental O–200–A | 2 | 33 4 | 21 6 | 160 | 962 | 1,500 | 70 | 8,000 | 119 | 515 | 18 | 28 | 740 | 15,300 | 1,205 | 1,055 | *a*£3,982 | *r*£4.1 | 400 | *r*4.2d. |
| Model 172B | 1×145 H.P. Continental O–300–C | 4 | 36 0 | 26 4 | 174 | 1,325 | 2,200 | 70 | 8,000 | 130 | 570 | 32.5 | 17.5 | 730 | 15,100 | 1,370 | 1,115 | *a*£4,620 | *r*£5.3 | 400 | *r*2.47d. |
| Model 175B | 1×175 H.P. Continental GO–300–C | 4 | 36 0 | 26 4 | 174 | 1,325 | 2,350 | 70 | 8,000 | 139 | 580 | 35 | 16.5 | 850 | 15,900 | 1,340 | 1,155 | *a*£5,548 | *r*£5.8 | 400 | *r*2.52d. |
| Model 180D | 1×230 H.P. Continental O–470–L | 4 | 36 0 | 26 0 | 174 | 1,530 | 2,650 | 70 | 8,000 | 160 | 675 | 51 | 13 | 1,130 | 21,500 | 1,030 | 1,330 | *a*£6,945 | *r*£7.7 | 400 | *r*2.9d. |
| Model 182D | 1×230 H.P. Continental O–470–L | 4 | 36 0 | 27 1 | 174 | 1,550 | 2,650 | 70 | 8,000 | 160 | 675 | 51 | 13 | 1,030 | 19,800 | 1,080 | 1,310 | *a*£7,035 | *r*£7.7 | 400 | *r*2.9d. |
| Model 185 | 1×260 H.P. Continental IO–470–F | 4/6 | 36 0 | 25 6 | 174 | 1,520 | 3,200 | 70 | 8,000 | 165 | 770 | 52 | 15 | 900 | 17,300 | 1,510 | 1,287 | *a*£8,482 | *r*£7 | 600 | *r*2.5d. |
| Model 210 | 1×260 H.P. Continental IO–470–E | 4 | 36 6 | 27 4 | 175.5 | 1,735 | 2,900 | 70 | 8,000 | 188 | 755 | 46 | 16.5 | 1,300 | 20,700 | 1,135 | 1,190 | *a*£10,814 | *r*£7.75 | 600 | *r*2.5d. |
| Model 310F | 2×260 H.P. Continental IO–470–E | 4/5 | 36 0 | 29 6 | 175 | 3,040 | 4,830 | 70 | 8,000 | 220 | 825 | 86 | 9.6 | 1,800 | 21,300 | 1,395 | 1,720 | *a*£27,410 | *r*£21.5 | 600 | *r*4.7d. |
| CH–1C Skyhook | 1×270 H.P. Continental FSO–526–A | 4 | *35 0 | †29 5 | — | 2,080 | 3,100 | N.A. | N.A. | 90 | 400 | 75 | 5.3 | 950 | N.A. | 0 | 0 | *a*£34,000 | N.A. | N.A. | N.A. |
| Champion 7–JC/7–FC Tricon and Tri/Traveller | 1×90 H.P. Continental C–90–12F | 2 | 33 5 | 21 8 | 165 | 968 | 1,450 | 75 | 4,000 | 108 | 500 | 22 | 23 | 900 | 10,000 | 550 | 720 | *a*£2,685 | N.A. | N.A. | N.A. |
| 7–GC/7–HC Sky-Trac/Dx'er | 1×140 H.P. Lycoming O–290–D2 | 2/3 | 33 5 | 22 1 | 165 | 962 | 1,650 | 75 | 7,000 | 120 | 600 | 32.4 | 18.4 | 840 | 16,800 | 750 | 718 | $7.5/8,000 | ‡$11.1 | 600 | $0.05(2) |
| Douglas DC–3 | 2×1,200 H.P. P. & W. R–1830–92 | 10 | 95 0 | 64 5 | 987 | 20,600 | 26,900 | 52 | 11,000 | 210 | 1,500 | 682 | 2.5 | 1,100 | 23,000 | N.A. | N.A. | *h*$100,000 | N.A. | N.A. | N.A. |
| Downer Bellanca 260 | 1×260 H.P. Continental IO–470 | 4 | 34 2 | 22 11 | 161.5 | 1,690 | 2,700 | 63 | 9,200 | 196 | 880 | 49 | 18 | 1,750 | 22,000 | 900 | 1,050 | $19,000 | $30.16 | 300 | $0.0447 |
| Fairchild/Fokker F–27 | 2×1,720 E.H.P. Dart S11 | 40 | 95 2 | 77 1 | 754 | 22,237 | 37,500 | N.A. | 20,000 | 272 | 1,840 | 1,099 | 1.67 | 1,290 | 34,000 | *k*4,100 | *k*3,580 | $7–800,000 | N.A. | N.A. | N.A. |
| Grumman Gulfstream | 2×2,105 E.S.H.P. Dart 529 | 10/12 | 78 4 | 64 6 | 615 | 20,993 | 35,100 | N.A. | 25,000 | 350 | 2,600 | 1,291 | 2 | 1,900 | 36,900 | 2,800 | 2,180 | *aj*£400,000 | N.A. | N.A. | N.A. |
| Helio Courier H–395A | 1×260 H.P. Lycoming GO–435–C2 | 5 | 39 0 | 30 0 | 231 | 2,020 | 3,920 | 63 | 8,800 | 147 | 707 | 50 | 14 | 1,250 | 20,050 | 600 | 493 | e$31,980 | N.A. | N.A. | N.A. |
| Super-Courier H–395 | 1×295 H.P. Lycoming GO–480–G1 | 5 | 39 0 | 30 9 | 231 | 2,012 | 3,920 | 70 | 8,600 | 160 | 670 | 50 | 13.4 | 1,350 | 22,500 | 331 | 355 | *a*£15,035 | £17.12 | 500 | 6.84d.(4) |
| Hiller UH–12E | 1×305 H.P. Lycoming VO–540–A1A | 3 | *35 5 | 40 9 | — | 1,700 | 2,750 | 75 | N.A. | 90 | 225 | 38.3 | 5.8 | 1,520 | 15,600 | 0 | 0 | *a*£27,090 | £24 | 600 | 21d. |
| UH–12E–4 | 1×305 H.P. Lycoming VO–540–A1A | 4 | *35 5 | 42 9 | — | 1,775 | 2,750 | 75 | N.A. | 90 | 225 | 38.3 | 5.8 | 1,520 | 15,600 | 0 | 0 | *a*£30,250 | £26 | 600 | 18d. |
| Howard Model 500 | 2×2,500 H.P. P. & W. R–2800–CB–17 | 12/14 | 70 4 | 57 10 | 537 | 21,700 | 34,000 | N.A. | 21,000 | 330 | 2,800 | 1,290 | 2.17 | 2,550 | 35,000 | 2,590 | 3,575 | $600,000 | N.A. | N.A. | N.A. |
| Hughes Model 269A | 1×180 H.P. Lycoming O–360–C2B | 2 | *25 0 | †22 3 | — | 867 | 1,550 | 85 | S.L. | 85 | 200 | 21 | 9.5 | 1,450 | 10,000 | 0 | 0 | $22,500 | *n*$10.65 | N.A. | *n*$0.065 |
| Lake LA–4 | 1×180 H.P. Lycoming O–360–A1A | 4 | 38 0 | 24 11 | 170 | 1,575 | 2,400 | 75 | 6,000 | 131 | 500 | 33 | 15 | 800 | 14,000 | *l*b650 | *l*b475 | $24,995 | N.A. | N.A. | N.A. |
| Lockheed AS Super 26 | 2×2,400 H.P. P. & W. R–2800 | 9/11 | 70 0 | 53 4 | 596 | 24,892 | 35,000 | N.A. | N.A. | 375 | 2,500 | 1,123 | 2.2 | 2,000 | 25,000 | *k*3,500 | N.A. | N.A. | N.A. | N.A. | N.A. |
| Lockheed Jetstar | 4×3,000 lb. P. & W. JT12A–6 | 10 | 53 8 | 60 6 | 542 | 22,450 | 40,100 | 71 | 35,000 | 495 | 3,050 | 2,189 | 1.4 | 3,500 | 45,000 | *k*7,600 | *k*5,100 | $1,350,000 | *n*$452.8 | 600 | $.0915(10) |
| Lockheed Lasa 60 | 1×260 H.P. Continental TSIO–470 | 6 | 39 4 | 28 1 | 210 | 2,024 | 3,752 | N.A. | 4,500 | 135 | 550 | 51.6 | 10.7 | 930 | 23,100 | 1,045 | 1,045 | *g*$22,000 | N.A. | N.A. | N.A. |
| McDonnell 220 | 4×3,000 lb. Westinghouse J34 | 12 | 57 7 | 66 6 | 550 | N.A. | 45,238 | N.A. | 44,900 | 522 | 2,340 | N.A. | N.A. | N.A. | N.A. | *k*4,135 | *k*4,135 | N.A. | N.A. | N.A. | N.A. |
| Meyers 200A | 1×260 H.P. Continental IO–470 | 4 | 30 6 | 24 4 | 161.5 | 1,870 | 3,000 | 75 | 8,000 | 198 | 964 | 66.6 | 17 | 1,245 | 19,700 | 1,550 | 1,150 | *g*$24,000 | N.A. | N.A. | N.A. |
| Mooney Mk. 21 | 1×180 H.P. Lycoming O–360–A | 4 | 35 0 | 23 2 | 167 | 1,490 | 2,450 | 55 | N.A. | 165 | 825 | 40 | 26 | 1,150 | 20,000 | 1,100 | *b*675 | *a*£7,350 | £6 | 300 | 2.2d. |
| Navion Rangemaster | 1×260 H.P. Continental IO–470 | 5 | 34 6 | 27 6 | N.A. | 1,879 | 3,150 | 60 | 6,000 | 173 | 1,510 | 90 | 16.8 | 1,250 | 20,500 | 980 | N.A. | *j*$25,000 | N.A. | N.A. | N.A. |
| North American Sabreliner | 2×3,000 lb. P. & W. J60 | 6 | 44 6 | 43 9 | 342 | 9,307 | 17,760 | N.A. | 44,000 | 475 | 1,725 | 750 | 2.4 | 5,360 | 45,000 | 3,590 | 2,465 | N.A. | N.A. | N.A. | N.A. |
| Oakland Super V | 2×170 H.P. Lycoming O–360–A1A | 4 | 32 10 | 24 9 | 177.6 | 2,020 | 3,400 | 65 | N.A. | 196 | 1,300 | 90 | 14.5 | 1,550 | 23,000 | 1,110 | 1,170 | N.A. | $30.04 | 500 | $0.025(4) |
| On Mark Marksman | 2×2,000 H.P. P. & W. R–2800–75/79 | 10 | 70 0 | 51 10 | 541 | 24,000 | 35,000 | 65 | 16,000 | 325 | 2,000 | 661 | 2.4 | 1,700 | 25,000 | 3,495 | 2,450 | $257,430 | $221 | 360 | $.0068(10) |
| Piper PA–18 Super Cub | 1×150 H.P. Lycoming O–320 | 2 | 35 3 | 22 6 | 178.5 | 930 | 1,750 | 75 | 7,000 | 115 | 460 | 30 | 15.3 | 960 | 19,000 | 500 | 725 | *a*£4,090 | £6.08 | 200 | 7d. |
| PA–22–108 Colt | 1×108 H.P. Lycoming O–235–C1B | 2 | 29 3 | 20 0 | 147.5 | 985 | 1,650 | 75 | 7,000 | 115 | 690 | 25 | 27.3 | 610 | 12,000 | 1,500 | 1,250 | *a*£2,798 | £4.5 | 200 | 5d. |
| PA–23–160 Apache | 2×160 H.P. Lycoming O–320–B | 5 | 37 0 | 27 1 | 207.5 | 2,320 | 3,500 | 75 | 7,000 | 173 | 840 | 60 | 14 | 1,050 | 17,000 | *b*900 | *b*670 | *a*£17,171 | £23.15 | 400 | 6.8d. |
| PA–23–250 Aztec | 2×250 H.P. Lycoming O–540–A1B5 | 5 | 37 0 | 27 7 | 207.5 | 2,775 | 4,800 | 75 | 7,000 | 205 | 1,025 | 120 | 8.5 | 1,650 | 22,500 | 1,100 | 1,360 | *aj*£29,041 | £27.15 | 400 | 7d. |
| PA–24–180 Comanche | 1×180 H.P. Lycoming O–360–A | 4 | 36 0 | 24 8 | 178 | 1,455 | 2,550 | 75 | 7,000 | 160 | 750 | 41.5 | 18 | 910 | 18,500 | *b*750 | *b*600 | *a*£8,020 | £13.9 | 400 | 7.5d. |
| PA–24–250 Comanche | 1×250 H.P. Lycoming O–540–A1A | 4 | 36 0 | 24 11 | 178 | 1,600 | 2,800 | 75 | 7,000 | 181 | 740 | 52.5 | 14 | 1,400 | 20,000 | *b*750 | *b*650 | *a*£9,747 | £12 | 600 | 7d. |
| PA–28–160 Cherokee | 1×160 H.P. Lycoming O–320–B | 4 | 30 0 | 23 4 | 159 | 1,195 | 2,200 | 75 | 7,000 | 132 | 675 | 41.6 | 17.6 | 680 | 15,000 | *b*775 | *b*550 | *a*£5,183 | N.A. | N.A. | N.A. |
| PA–25 Pawnee | 1×160 H.P. Lycoming O–320 | 1 | 36 2 | 24 0 | 183 | 1,200 | 2,300 | 75 | 7,000 | 95 | 440 | 33 | 12.5 | 505 | 11,300 | 1,375 | *b*440 | *a*£5,045 | N.A. | N.A. | N.A. |
| Shinn/Morrisey 2150A | 1×150 H.P. Lycoming O–320–A2A | 2 | 30 0 | 21 3 | 144 | 1,125 | 1,817 | N.A. | N.A. | 135 | 525 | 29 | 18 | 1,450 | 22,000 | 440 | 450 | $9,500 | N.A. | N.A. | N.A. |
| Smith Tempo II | 2×2,100 H.P. P. & W. R–2800–C | 10/12 | 73 5 | 60 3 | 569 | 24,500 | 35,000 | 67 | 20,000 | 350 | *q*2,400 | 973 | 2.5 | 1,650 | 29,600 | 3,120 | 3,220 | $440,000 | N.A. | N.A. | N.A. |
| Trans-Florida Cavalier 2000 | 1×1,495 H.P. Merlin V–1650–7 | 2 | 40 1 | 32 2 | 272.3 | 7,121 | 10,500 | N.A. | 20,000 | 370 | 2,000 | 313 | 6 | 2,550 | 40,000 | 1,800 | 1,750 | *j*$48,500 | N.A. | N.A. | N.A. |
| Umbaugh Model 18 | 1×180 H.P. Lycoming O–360 | 2 | *35 0 | 20 2 | — | 1,015 | 1,600 | 65 | 5,000 | 100 | 350 | 25 | 14 | 900 | 15,000 | 0/50 | 60 | £4,194 | $6.0 | 300 | $0.03 |

* Rotor diameter; † Fuselage length; ‡ Estimated; *a* Including U.K. duty 17½%; *b* Ground run; *c* IFR stage length; *d* Airline method; *e* FAF price; *f* Includes crew pay; *g* Approximately; *h* Typical executive conversion; *j* Including full radio; *k* Field length; *l* On airfield; *m* In standard form; *n* Direct Operating Cost; *p* From IFR-equipped first cost; *q* Including allowances and 45 min. reserve; *r* 7-year depreciation; *s* 10-year depreciation.

# The Fighting Services

## "First Tourist" V-Bomber Captains

LAST week a 23-year-old Flying Officer of No. 90 Squadron rejoined his unit at R.A.F. Honington as the first of the selected junior V-bomber co-pilots to become a captain. Known as "first tourists," members of this category of co-pilots are chosen from the most promising student pilots at the R.A.F. College, Cranwell, or the flying training schools. By this new means the lengthy traditional path to the command of a V-bomber has been short-circuited.

Until three years ago when this new Bomber Command policy was initiated, V-bomber pilot selection was based on the, then, current aircrew plan that all new pilots generally went through a fighter O.C.U. after which they had at least one tour on a day fighter squadron before transferring to all-weather fighter or bomber rôles. For selection as a captain of a Valiant, Vulcan or Victor, a pilot had to possess an "above average" flying rating, have flown some 1,750 hr. as a first pilot, and completed a tour on Canberras. V-bomber co-pilots also had to have a Canberra tour behind them and a minimum of 700 hr. in command.

With this latest straight-through training scheme, as soon as the selected student pilot has received his "wings" he goes directly on to the type of V-bomber that he is eventually to command. Arriving at the O.C.U., with approximately 290 hr. in his log book, he joins the other members of his crew and undertakes the three-month course to become a co-pilot in the normal way. This is followed by a three-year tour with an operational squadron.

During the first 12 months of the tour he completes his airmanship and tactical training under the guidance of his captain to become a competent co-pilot during the second year. After 18 months the first tourist co-pilot returns to the O.C.U. to undertake a three-week conversion course to fly from the left-hand seat. He then goes back to his squadron and flies for about 50% of the time from the left-hand seat under instruction from his captain.

At the end of this three-year tour he is again posted to an O.C.U. to form his own crew and undertake the 55-hr. conversion course to become a captain. He then either returns to his old squadron or is posted to another unit to start a second three-year tour.

When this stage is reached the "first tourist" captain has logged some 1,200 flying hours, of which 800-900 hr. will have been on V-bombers and about 250 hr. as first pilot under supervision. He also has a green instrument rating.

With the selection of Cranwell cadets and F.T.S. student pilots as possible future V-bomber captains, both permanent and direct commission officers can reach this type of command at an early age. It is also interesting to note that in the first of these crews the co-pilot and air electronics officer are 21 years of age, while the nav./radar and nav./plotter are Flight Lieutenants and about 30.

## Air Rank Appointments

AIR VICE-MARSHAL C. T. WEIR, C.B., C.B.E., D.F.C., is to become Commandant of the School of Land-Air Warfare on May 15. Until recently Senior Air Staff Officer at Headquarters, Near East Air Force (Cyprus), Air Vice-Marshal Weir went to Christmas Island in 1956 as Task Force Commander for the nuclear tests in the Pacific.

A former Halton apprentice, Air Cdre. W. D. Disbrey, C.B.E., A.F.C., has taken over command of No. 1 Radio School at R.A.F. Locking. He was until recently seconded to the Ministry of Aviation.

Gp. Capt. I. J. Spencer, D.F.C., has been appointed Air Officer in charge of Administration, Transport Command, with the acting rank of Air Commodore. He was Director of Plans at Headquarters, 2nd T.A.F., in 1956, and later took over command of R.A.F. Benson. Prior to his new post Air Cdre. Spencer was Senior Officer in charge of Administration at Headquarters, No. 38 Group.

## Bombing and Navigation Competition

IN this year's annual Bomber Command bombing and navigation competition the premier award—the Laurence Minot Trophy, for the best squadron in combined bombing and navigation—was won by No. 90 Squadron (Wg. Cdr. J. Miller, D.F.C., A.F.C.) operating Valiants. The Armament Officers' Trophy for bombing went to No. 10 Squadron (Wg. Cdr. R. B. Phillips, D.F.C., A.F.C.) equipped with Victors; and the Sir Philip Sassoon Trophy for navigation was awarded to No. 57 Squadron (Wg. Cdr. D. G. Bailey) also operating Victors.

Flg. Off. P. N. Perry, first of the junior V-bomber co-pilots to be made a captain.

The individual crew winners were Sqn. Ldr. M. G. Beavis of No. 617 Squadron (Vulcans) whose crew won the combined bombing and navigation; Sqn. Ldr. W. B. Young of No. 10 Squadron for the best crew in bombing and Wg. Cdr. H. M. Chinnery, No. 138 Squadron (Valiants), best crew in navigation.

Both navigation and bombing results were an improvement on last year's—which were in themselves a record. U.S.A.F. crews did not participate, but a team of observers attended from Headquarters, Strategic Air Command.

## Far East Proficiency Trophy

FOR the second time running No. 60 Squadron (Wg. Cdr. P. Smith), equipped with Meteor NF. 14s, has won the Scarf Trophy awarded to the most proficient F.E.A.F. squadron in the use of fighter and ground attack weapons. In winning the trophy the Squadron's four aircraft and crews defeated representatives of Nos. 3 and 77 Squadrons, R.A.A.F., operating Avon-Sabres from Butterworth and No. 28 Squadron equipped with Venoms in Hong Kong.

Based at R.A.F. Tengah, Singapore, No. 60 won the competition when it was last held in 1957. Then operating Venoms, the Squadron is at present in the process of converting from its Meteors on to Javelin FAW.9s. The first Javelin crews and aircraft were due to arrive on the island last month.

## R.A.F. Appointments

THE following are among recent Royal Air Force appointments:—

**Air Ministry:** Wg. Cdr. R. J. Bartlett to the Department of the Air Member for Supply and Organisation.

**Bomber Command:** Wg. Cdr. T. C. Imrie, D.F.M., to Headquarters for signals duties; Wg. Cdr. N. A. J. Mackie, D.S.O., D.F.C., to R.A.F. Coningsby to command the Administrative Wing.

**Technical Training Command:** Wg. Cdr. F. A. Coleman to R.A.F. Newton as Senior Lecturer.

**Maintenance Command:** Wg. Cdr. T. C. Parker, O.B.E., to R.A.F. Andover as Permanent President, Standing Court Martial.

**Signals Command:** Wg. Cdr. R. F. H. Ramsay to R.A.F. Watton for operations duties.

**Air Forces Middle East (Aden):** Sqn. Ldr. D. W. E. Davies to R.A.F. Khormaksar as Senior Technical Officer, with acting rank of Wg. Cdr.

**Far East Air Force:** Wg. Cdr. L. G. Goodey, D.F.C., to Headquarters, No. 224 Group, as Ground Signals Officer; Sqn. Ldr. J. K. Holt to Headquarters for operations duties, with acting rank of Wg. Cdr.

**Other Appointments:** Gp. Capt. P. P. Hanks, D.S.O., D.F.C., A.F.C., to the Ministry of Aviation; Wg. Cdr. C. P. H. Kunkler to R.A.F. Luqa, Malta, to command the Flying Wing.

## More Service News

**Invention Award.**—Flt. Sgt. D. Allison, a ground radar fitter stationed at R.A.F. North Coates, has been awarded £500 by the Air Council for devising test equipment and writing two handbooks associated with the unit. The sum includes £50 awarded by A.O.C.-in-C., Fighter Command. This is one of the largest awards yet made.

**No. 223 Squadron.**—This year's annual reunion of No. 223 Squadron is to celebrate the Squadron's re-formation in November, 1959, and will be held on Saturday, May 6, at the R.A.F. Reserves Club. Tickets, price 7s. 6d. each, can be obtained from Colin Turner, M.P., House of Commons, Westminster, S.W.1, who is also interested to trace members who served with Capt. De La Rue in Italy in 1917.

**Two Stations Closing.**—R.A.F. Hawkinge, near Folkestone, is to close at the end of this year and R.A.F. Wellesbourne Mountford is to close at the end of 1963.

# Correspondence

## An Error in Space Time

WITH reference to the Gagarin space flight, in *Red Star* for Apr. 13 the Tass statement says: "According to data received from the space ship Vostok at 09.52 Moscow time the pilot-cosmonaut Major Gagarin, then over South America, transmitted 'The flight is proceeding normally and I feel well.'"

It looks as though the 07.15 (09.15 GMT) was a mistake—perhaps typographical—which got perpetuated.

Chippenham, Wilts. "REGULAR READER."

## Red-letter Day?

APRIL 12 was indeed an auspicious day: for, in addition to being the day on which a man was first put into orbit, and the 50th anniversary of the first direct London to Paris flight (THE AEROPLANE AND ASTRONAUTICS, Apr. 20, p. 422), it was also the 24th anniversary of the first run of the first jet engine—the Power Jets W.U.

Cheltenham, Glos. DON BROWN.

## A Question of Translation

IF the translation is exact Major Gagarin's words, "Many techniques for landing have been developed . . . one of which is the parachute technique. In this flight we employed the following system . . ." and so on do suggest that he changed his mind about what to say, as your writer says (THE AEROPLANE AND ASTRONAUTICS, Apr. 20, p. 437).

I should like to point out that this is all straightened out and makes a perfectly sensible and continuous statement if one word is altered. The Russian words for "the following" and "the latter" are very similar. It seems much more probable that what the cosmonaut really said was, "Many techniques for landing have been developed in our country, one of which is the parachute technique. In this flight we employed the *latter* system. The pilot was in the cabin of the spaceship."

London, N.W.5. R. J. SCAMMELL.

## Ejection Near the Ground

IN the description of Zero-Zero Ejection (THE AEROPLANE AND ASTRONAUTICS, Apr. 13) a most important point concerning low-level ejections was omitted. This concerns the flight path of the aeroplane relative to the ground.

If the aeroplane is descending:—

(a) Height will be lost from the time the decision to eject is made until the blind is pulled.

(b) Height will be lost from the time the blind is pulled until the seat is fired.

(c) The height to which the seat is fired relative to the ground will be reduced.

These three combined factors depend on the actual rate of descent of the aeroplane, but the effect on the height of parachute deployment can be so great that ejection is unsuccessful, even with present-day "runway escape capability" seats.

Although the aeroplane attitude is obviously important it must be realized that an aeroplane in a level attitude and not nose down can still be descending rapidly. The great thing is to reduce the rate of descent, to establish a rate of climb if possible, before ejecting near the ground.

Whether the rocket seat is sufficient for safe ejection from an aeroplane descending at a fairly high rate close to the ground I do not know.

R.A.F. Upavon. D. G. P. BROWN, M.B., Ch.B. (Sqn. Ldr., R.A.F.)

[We understand from the Martin-Baker company that in addition to its zero-zero capability their rocket-assisted ejection-seat was developed specifically to overcome escape problems from aircraft in a high rate of sink at low altitude, or in a nose-down attitude.—ED.]

## Groundabout

*International Column*

**Deutschland Uber Altitude.** The Germans are really beginning to get aviation lined up. Cologne-Bonn airport's elevation has for years been 267 ft. Suddenly they've raised it to the nice round figure of 300 ft., according to the latest Airway Manual amendment. There comes to mind the old joke about the C.F.I. who told a querulous pupil "You have my word for it—nobody is moving the airfield up and down."

✶

**Canadian Parade.** An R.C.A.F. squadron leader whose handwriting is, shall we say, highly individual, drafted a memorandum containing the sentence "Deviations from the R.C.A.F. Drill Manual should be made known in the parade order and so avoid embarrassment to executive officers who must wait to see whether an apparent wrong command was being ignored or acted upon by their parade contemporaries." The squadron leader's secretary, who obviously thought it was time that R.C.A.F. Penhold, Alberta, got a mention here, achieved that distinction by typing "wing commander" instead of "wrong command."

✶

**American Negative.** Showing films in airliners is proving a doubtful attraction. I hear of two Americans meeting in Miami airport and one said "Hi, Mac—how come you're here when you told me in New York you were going to Los Angeles?" "I switched," replied the other, "I'd seen the film."

✶

**Lebanonplussing.** Russia's manned satellite is pretty ordinary-looking, after all, if we can believe the accompanying picture, from a Beirut paper, and its caption, which reads "'THE VOSTOK': This is an artist impression of 'Vostok' (it means 'East' in Russian), the Soviet spaceship which took the first man into space and brought him back alive." Looks more like an anti-Castro B-26 to me. Strangely enough, there is on the same page a picture of a sort of cone-shaped container with a man sitting in it, which *is* captioned as an anti-Castro B-26. All very confusing.

«THE VOSTOK»: This is an artist impression of «Vostok» (it means «East» in Russian), the Soviet spaceship which took the first man into space and brought him back alive.

✶

**Le Badinage Belgique.** A Belgian fellow-journalist on the recent Peruvian proving flight showed a nice turn of humour when he asked "Duncan Sandys—isn't he the man who mixed aviation with politics?"

✶

**La Pluralité Française.** It looks as though the French think this column covers so much ground that there must be more than one of me—my invitation to the Paris Show was addressed to "Monsieur Wrens." Just a minute, though—it should be "Messieurs." Oh, well, that's killed that.

✶

**BOING.** An over-loyal proof-reader changed this column's reference (Apr. 20) to the Boing Airplane Co. to the Boing *Aeroplane* Co. I suppose I should be grateful for this not being called the Boing Aeroplane and Astronautics Co. I don't know, though, it might be an improvement.

by Wren

Windscreens by TRIPLEX

# THE AEROPLANE and ASTRONAUTICS CLASSIFIED ADVERTISEMENTS

**PRESS DAY: Classified Advertisements must normally be received at Head Office by FIRST POST THURSDAY for the following Thursday's issue. Last-minute additions and deletions are accepted by telephone from trade advertisers up to noon. Advertisements received too late for a particular issue are automatically inserted in the succeeding one unless instructions to the contrary are received.**

**RATES**—1/- per word (minimum 12 words 12/-). Each paragraph charged separately and name and address must be paid for. Semi-displayed setting £3-17-6 per single column inch. Centred lines 22/6. Series discounts of 5% for 13, 10% for 26 and 15% for 52 consecutive insertions, allowed to trade advertisers.

**TERMS**—Strictly net and prepayable. Monthly accounts for settlement by the end of the month following insertion are allowed to trade advertisers if satisfactory references are provided.

**REMITTANCES**—Cheques and postal orders should be crossed and made payable to TEMPLE PRESS LIMITED and instructions sent addressed to the Manager, "The Aeroplane and Astronautics," Bowling Green Lane, London, E.C.1.

**DEPOSIT SYSTEM**—Facilities are available to readers to purchase advertised goods through "The Aeroplane and Astronautics." Commission 1% (minimum 2/-) on amount deposited.

**BOX NUMBERS**—Private advertisers desiring to have replies sent care of "The Aeroplane and Astronautics," may do so on payment of 1/- to cover booking and postage, plus cost of four extra words. Box Numbers must not be used for the purpose of circularizing and the Proprietors do not undertake the distribution of such matter received. To avoid mistakes in forwarding, Box Numbers should be carefully and legibly copied and replies sent to Box A000, care of "The Aeroplane and Astronautics," Bowling Green Lane, London, E.C.1.

**THE PROPRIETORS** retain the right to refuse or withdraw advertisements at their discretion and are not responsible for clerical or printers' errors, although every care is taken to avoid mistakes.

**HEAD OFFICES:** Bowling Green Lane, London, E.C.1, England. Telephone: Terminus 3636. Telegrams: "Pressimus London Telex." Telex: 23839.

**BRANCH OFFICES:** Bayliss House, Hurst Street, Birmingham, 5. Telephone: Midland 6616. 50 Hertford Street, Coventry. Telephone: Coventry 27414. 1 Brazennose Street, Manchester. Telephone: Deansgate 6114–8. 12 Renfield Street, Glasgow. Telephone: Glasgow Central 1413.


30 YEARS EXPERIENCE & SERVICE

**AT LAST!**

A British light aircraft that can compete with the best in the World. The first production batch of the new

**Beagle Auster AIREDALES**

have been purchased exclusively by Shackleton's for sale to our clients.

Delivery of the very first production AIREDALE will be before the end of June, and thereafter at a rapidly increasing rate to meet the demand from home and overseas.

This is a wonderful moment for which we at Shackleton's have waited a long time and we take the greatest pride in making this announcement.

For the finest light aeroplane in the World

**BUY BRITISH — BUY BEAGLE**

NEW OR USED AIRCRAFT SUPPLIED | CREDIT TERMS ARRANGED | PART EXCHANGE WITH OTHER AIRCRAFT OR CARS

**W.S. SHACKLETON** AVIATION LIMITED | 175 PICCADILLY, LONDON, W1 HYDE PARK 2448/9

Cables: Shackhud, London

**EUROPE'S LEADING AIRCRAFT TRADERS**


## AIRCRAFT FOR SALE

CHRISLEA ACE, one owner, 350 hrs. airframe and Gipsy Major engine, two years' unexpired C. of A., starter, dual, generator, Murphy 5-channel V.H.F., many crystals. Rapide, converted for family long-distance touring, 40-gal long-range tank, 24V. Marconi A.D.F. 7092, Murphy M.R.100 fully crystalled, command M.F.-H.F. Lear Orienter brand new, with many spares. Cash offers invited, separate items, the lot, or exchange new American aircraft. Write only: Fox, 75 Deanhill Court, Upper Richmond Rd. W., E. Sheen, S.W.14. 586-583

A Handley Page Marathon, only 1,000 hours since new, C. of A. expires July, 1961, fully airline equipped including radio, 20 seats, V.I.P. interior, immediate delivery, £6,500.

DOVE users, propeller, C.S.U.s, starters, Gipsy Queen 70/4s, all nil hours, overhauled by makers. MILES Gemini, Mark IA, full dual control, radio, many extras. Derby Aviation, Limited, Derby Airport. Phone, Etwall 521. 585-570

GRANTAIR, LTD.,
GRANTCHESTER, CAMBRIDGE.
Phone, Trumpington 3132 (24 hours per day).

YOU have a licence—we have aircraft. Recent C. of A. (private or hire and reward). H.P. or leasings. British and American, two, four or more seats, with or without radio, £1,000 to £10,000. Demonstrations anywhere, any time. Hire one for a week before you buy it. See also aircraft for hire and charter. zzz-768

**£2,685.** New low-priced American 2-place tricycle geared tourer/trainer. The Aeronca Champion. The favourite of flying schools. Contact Maitland Drewery, Biggin Hill Airport. 585-4

JODEL MUSKETEER.

4-SEATER, 200 lb. baggage, or 5-seater with adequate luggage, six hours' range at 140 m.p.h., will operate with full load from fields of 250 yd., with luxurious furnishing, gyro compass and horizon at only £4,816; fly away Redhill Aerodrome. Try it yourself—contact

ROLLASON AIRCRAFT AND ENGINES LTD.,
CROYDON AIRPORT.
Phone, Croydon 5151-52. 585-14


BUSINESS AIRCRAFT

**Beechcraft**

Available from **Shorts**

The Queen Air

Introduced only last year, this superb aeroplane carries seven people for an I.F.R. range of 850 miles with full airline allowances at 192 m.p.h. Details of this and other Beechcraft models may be obtained from the British Isles distributors—

SHORT BROTHERS & HARLAND LTD
Light Aircraft Division | Queen's Island, Belfast, N. Ireland or The Aerodrome, Rochester, Kent

**TWIN BEECHCRAFT**
**D18S (C45H)**
**from $7500**
Depending on engine T.S.O.

These are the military C45H, the same as D18S civil model, with 6 or 9 place interior, lined and soundproofed, hydromatic props, auto pilot, radio including ADF, and dual instruments.
50 planes in perfect flying condition and complete with ferry permits to choose from. Let us quote you on C. of A. for export, custom interiors and flight delivery.

*Write: Mr. G. R. Board* *Cables: SELAIR*

**AERO AMERICAN CORP.**
808 N. Erin Blvd. Tucson, Arizona, U.S.A.


FOR SALE,
LEASE OR LEASE-PURCHASE,
SPECIALLY ENGINEERED, LONG-RANGE, HIGH-PAYLOAD
1049H SUPER CONSTELLATION AIRCRAFT.

- Most economical long-range, high-payload aircraft available.
- Special engineering on aircraft permits payloads of 45,000 lb. cargo or 120 passengers for 2,500-mile range.
- Either in cargo, passenger or convertible configuration.
- Financing available.

DON'T BUY ANY LARGE TRANSPORT AIRCRAFT UNTIL YOU HAVE LOOKED AT THESE AIRCRAFT FOR FLEXIBILITY, PAYLOAD CAPACITY AND ECONOMY IN OPERATION.

ALSO

C-46F AIRCRAFT,
PASSENGER AND CARGO,
WITH OR WITHOUT T-CATEGORY KIT INSTALLED.

Call or cable
FRED BENNINGER,
Executive Vice-President,
THE FLYING TIGER LINE, INC.,
BURBANK, CALIFORNIA.
Phone, Triangle 7-3411. Cable, Flytiger. 585-733

SUPER Custom Piper Apache 150, 1957, under 800 hours since new, C. of A. just renewed, 360-channel V.H.F., Lear A.D.F., Narco Omnigator, M.B. receiver, full de luxe specification, £10,250. London Aero Club, Ltd., Panshanger Aerodrome, Hertford. Phone, Essendon 305. 585-6

ONE OF THESE

Piper Comanche

Piper Colt

and

ONE OF THESE

Bristol 406

Fiat 600

**PROVIDE IDEAL BUSINESS OR PERSONAL TRANSPORT**

The advantage of dealing with a firm selling cars *and* aircraft is that any used car may be taken in exchange.

We are official agents for **Piper aircraft** and distributors of **BRISTOL, FIAT, A.C., ABARTH, VIOTTI & ZAGATO CARS.**

**ANTHONY CROOK MOTORS LTD.**

THE ROUNDABOUT, HERSHAM, SURREY (20 mins. Waterloo) Tel.: Esher 4580. Walton-on-Thames 28822 (12 lines)


**Aircraft for Sale—contd.**

TIGER MOTH, full category C. of A., 800 hrs. run on engine. C. of A. expires May 29, 1961; with C. of A. renewed for 12 months, £495 for quick sale. Christchurch Aero Club, The Aerodrome, Christchurch. Phone 1689. 586-581

## Aircraft Wanted

SCRAP aircraft aluminium and stainless steel urgently required. Lowton Metals, Ltd., Lowton St. Mary's, near Warrington. Leigh 71441-2. zzz-0766

WANTED, DC-4 long-range Skymaster, preferably in run-down condition. Box A845, care of THE AEROPLANE AND ASTRONAUTICS. 587-574

## AIRCRAFT ACCESSORIES, SPARES AND COMPONENTS

ROLLASONS for Tiger Moth spares. Gipsy engine overhauls and spares and now increased facilities at Biggin Hill for your C. of A. overhaul. All light aircraft types acceptable. zzz-775

THE REGIONAL AIR TRAINING CO., Croydon Airport, for Rapide spares of every description. Phone, Croydon 8521. zzz-762

PHILLIPS AND WHITE, LTD.

THE leading stockists in the U.K. for instruments, navigational equipment, electrical components and parts, and engine accessories. Spares for de Havilland Gipsy, Major and Queen series and Armstrong Siddeley Cheetah IX, X and XV engines.

61 QUEEN'S GARDENS, London, W.2. Phone, Ambassador 86511, 2764. Cables, "Gyrair, London." zzz-772

REPAIRCRAFT, LTD., The Common, Cranleigh, Surrey (Cranleigh 536), for instruments and auto-pilot overhaul. zzz-749

AIRFRAME spares for Dakotas, Harvards, Piper Cub, Fairchilds, Argus, Beechcraft, D-17s, Mosquito, Spitfire, Firefly. Engine spares for Pratt & Whitney, Armstrong Siddeley, Lycoming, etc., accessories and instruments for all types of aircraft.

C.47 Dakota operators please note, we offer a limited number of genuine brand-new Bendix 52O58 tail wheels at a reasonable price.

A. J. WALTER, LTD., The Drive, Horley, Surrey. Phone, Horley 1420 and 4294. Cables, "Cubeng Horley." 585-12

SEAT-TYPE nylon parachutes, 28-ft.-diameter, American manufacture, £15 each, complete. Bradfords, Ramsey, Harwich, Essex. 588-572

FOR SALE.

SPARE PARTS INVENTORY

FOR

C-46, DC-4, DC-6, 1049H,

CONSTELLATION AIRCRAFT.

ALSO

WRIGHT COMPOUND

3350-EA-3 ENGINES.

PRATT & WHITNEY

R2800 CB16/17 ENGINES.

THE FLYING TIGER LINE, INC.,

BURBANK, CALIF.

CALL OR CABLE

DOUG DULY.

Phone, Triangle 7-3411. Cable, "Flytiger." 585-0723

BENDIX J-8 Horizons, instruments, relays for Dakotas, Sabres, Neptunes, Bendix VOR-ILS, radio and compass equipment. Fairchild Aircraft, Cameras, Gun Cameras and Spares. E.W.S. Co., 69 Church Rd., Moseley, Birmingham. 585-536

AIRFRAME spares for Rapide, Tiger Moth, Oxford. Consul available. Also Cheetah X engines and spares. Marshall, Christchurch Aerodrome, Christchurch. Phone 1689. 586-582

PLUGS and sockets. More than 1,000,000 in stock covering over 50 different ranges. British and American. Stock list on application to: Sasco, Nutfield, Redhill, Surrey. Phone, Redhill 5050. zzz-784

## AIRCRAFT SERVICING

HANTS AND SUSSEX AVIATION, LTD., Portsmouth, have now obtained additional hangar space and can offer facilities for C. of A. overhauls, modifications and all types of repairs. Phone, Portsmouth 62087. 585-2

## HELICOPTERS

FOR specialized helicopter operations in engineering and survey, agricultural spraying, passenger transport, flying training—contact Helicopter Services, Ltd., Luton Airport. Phone, Luton 4911. zzz-783

## CLOTHING

R.A.F. Officers' uniforms for sale, new and reconditioned. Fisher's, 86-88 Wellington St., Woolwich. Phone 1055. Kits also purchased. zzz-774

## CONSULTANTS

R. W. SUTTON (CONSULTANTS), LTD., 7 Lansdowne Place, Cheltenham. Phone 5811. 588-539

IAN S. McNICHOL, London School of Air Navigation. Pilot and navigator training with advisory service. 33 Ovington Square, Knightsbridge, S.W.3. zzz-791

## ELECTRICAL EQUIPMENT

ELECTRICAL connectors. More than 1,000,000 in stock, covering over 50 different ranges. British and American. Stock lists on application to Sasco, Nutfield, Redhill, Surrey. Phone, Redhill 5050. zzz-785

## ENGINES AND ENGINE SPARES

ENGINE overhauls. Hants and Sussex Aviation, Ltd., offer Britain's most comprehensive overhaul service, including magneto and component overhaul, with spares supply. All D.H. range up to Queen 30 Mk. 2 for Heron, Armstrong Siddeley, Blackburn Cirrus, Lycoming and United Kingdom distributors of Continental motors. Huge exchange pool most type engines. Specialists in export work. Address: The Airport, Portsmouth, Hants. Phone 63051 585-693


# R. K. DUNDAS LTD.

**Announce 1961's most exciting news . . . . .**

**as the sole distributors throughout the United Kingdom for the**

## MOONEY AIRCRAFT COMPANY

**we offer the all-new, all-metal, fastest, sleekest, most economical, lowest cost, high-performance single-engined Airplane the . . . .**

# MOONEY Mk 21

**R. K. DUNDAS LTD., DUNDAS HOUSE, 59 ST. JAMES'S STREET, LONDON, S.W.1**

**Phone: HYDE PARK 3717**

## CUNARD EAGLE AIRWAYS LIMITED

LONDON AIRPORT · HOUNSLOW · MIDDX.

require

**RADIO ENGINEERS**
(Ref.: M.10.)
with 'A' Licence and Rating
(or of near Licence Standard)
**Starting rates from £930 p.a.**

**'X' LICENSED INSTRUMENT AND ELECTRICAL ENGINEERS AND INSPECTORS**
(Ref.: M.4.)

**AIRCRAFT INSTRUMENT MECHANICS AND ELECTRICIANS**
(Ref.: M.18.)

**LICENSED AIRCRAFT ENGINEERS, INSPECTORS AND CHARGEHANDS**
experience with Britannia, Viscount or DC.6 Aircraft is essential
(Ref.: M.12.)

**Salaries—Engineers and Inspectors £930-£1,240 p.a.**

**Salaries—Chargehands, £13-£16 per week**

***All Applications in writing, quoting the appropriate reference, to the Personnel Officer***

**THE BRITISH AIRLINE PILOTS ASSOCIATION**
81, New Road, Harlington, Middx. *Tel. HAYes 3442/3*

Membership open to all Commercial and Service Pilots. For full details as to Objects and particulars of Membership, please write to General Secretary.

**CROSS** PERFECT PRECISION AIRCRAFT SPRING WASHERS
TO B.S. SPECIFICATION 2 SP.47
**CROSS MFG. CO. (1938) LTD**
COMBE DOWN, BATH. Tel.: Combe Down 2386/8

**MARSHALLS**
**AIRPORT WORKS CAMBRIDGE**
Require
**TECHNICAL ILLUSTRATORS**
To produce high quality aircraft illustrations from working drawings. Layout technique together with technical knowledge essential.
Knowledge of aircraft desirable but not essential.
*Written applications in first instance to*
**PERSONNEL MANAGER**

## HIRE AND CHARTER

**GRANTAIR, LTD.,**
GRANTCHESTER, CAMBRIDGE.
Phone, Trumpington 3132 (24 hours per day).

You have a licence—we have aircraft with or without pilot, with or without radio, two or four seats. Tri-pacers, Caribbears, Cubs or Austers, for hire or lease. (Free maintenance, insurance and repairs.) From £3 10s. per engine hour without pilot or 1s. 3d. per mile with pilot.

Europe—Africa or Asia covered. See also Aircraft for Sale. zzz-769

AUSTER 4-seater, to hire on bare whole, charter basis J1N preferred, early June-Mid-September. Western Airways, Weston-super-Mare 2700. 585-7

## MISCELLANEOUS

BUILD your Luton Minor: drawings £12. Major 2-seat £20. All materials, instruments, wheels, J.A.P. engine spares. Phoenix Aircraft, Cranleigh, Surrey. 585-8

## PACKING AND SHIPPING

R. AND J. PARK, LTD., 143-9 Fenchurch St., E.C.3. Phone, Mansion House 3083. Official packers and shippers to the aircraft industry. zzz-782

## PATENTS

THE proprietor of Patent No. 683762 for "Improvements in Muffler Construction" desires to secure commercial exploitation by licence or otherwise in the United Kingdom. Replies to Haseltine Lake and Co., 28 Southampton Buildings, Chancery Lane, London, W.C.2. 586-584

## PHOTOGRAPHY

AEROPLANE photographs, 5,000 available, including 1914-19 warplanes, latest U.S.A. and British jets. 5½ in. by 3½ in., 6s. per dozen. Lists and specimens, 2s. 6d. post free. Also thousands of ships and railways. Real Photographs, Ltd., Victoria House, Southport. 585-1

## RADIO AND RADAR

SPERRY ZERO reader, Type ZL1 course selectors, control panels, flight computers and indicators, three complete installations in stock. A. J. Whittemore (Acradio), Ltd., Biggin Hill Aerodrome, Kent. zzz-780

STR12D, STR9Z, STR9X and most other British and American V.H.F. R/T equipment always in stock. A.R.B.-approved design installations into any type of aircraft. A. J. Whittemore (Aeradio), Ltd., Biggin Hill Aerodrome, Kent. zzz-781

## SITUATIONS VACANT

PILOTS, Viscount Captains and First Officers required. Maitland Drewery Aviation, Gatwick Airport. 585-568

DOVE A and C licensed aircraft engineers required for overseas duties, good pay with local allowances and free accommodation. Apply Chief Engineer, Morton Engineering Services, Gatwick Airport. Phone, Livingstone 8855, ext. 60. 586-571

**THE HONG KONG AIRCRAFT ENGINEERING CO., LTD.**

THE ABOVE COMPANY WILL HAVE A VACANCY IN THE AUTUMN FOR AN

**AERONAUTICAL ENGINEER**

OF OUTSTANDING TECHNICAL AND ADMINISTRATIVE ABILITY.

The appointment will be filled by the applicant whose qualifications will justify rapid advancement and a high salary with the generous allowances applicable to appointments in Hong Kong.

Only applicants who can comply with the following should apply.

1. Age between 32 and 38 years.
2. Wide experience of aircraft and engine overhaul and maintenance, not only from the practical but also from the managerial aspect. Particular attention will be given to candidates with experience of large modern aircraft such as Boeing 707, Britannia, Comet and DC-6.
3. Considerable administrative experience with an operator of the above or similar aircraft.
4. In receipt of a present salary of not less than £1,800 per annum.
5. Qualified for membership of the Royal Aeronautical Society.
6. Available for preliminary interview in the U.K. immediately and a final interview in September.

Applicants should apply in writing to:—
**MATHESON AND CO., LTD.,**
3 LOMBARD STREET, LONDON, E.C.3,
stating personal details and enclosing resume of employment to date, all of which will be treated in strict confidence. 586-576

VIKING captains and first officers wanted. Apply Chief Pilot, Pegasus Airlines, Gatwick Airport. 585-11

BRISTOL (LULSGATE) AIRPORT. Club instructor required, congenial conditions. Commercial licence with assistant instructor's rating preferred, permanent position. Apply Bristol and Wessex Aeroplane Club, Ltd. 585-13

LICENSED engineers required for maintenance of small fleet of aircraft. Category A and C, on Auster, Tiger, PA 22, Rapide, Consul/Oxford, South Coast. Apply Box A851, care of THE AEROPLANE AND ASTRONAUTICS. 586-580

THE Wiltshire School of Flying, Thruxton Aerodrome, Andover, Hants, require a Chief Flying Instructor, must hold commercial licence. Also vacancies for assistant instructors. 586-578

**AIR TRAFFIC CONTROL OFFICER**
FOR
**LEEDS AND BRADFORD AIRPORT.**

DUE TO INCREASE IN ESTABLISHMENT ONE AIR TRAFFIC CONTROL OFFICER REQUIRED.

M.o.A. Certificate of Competency essential, with Radar Rating an advantage. Flying experience and recent A.T.C. experience essential. Salary range of £815-£950 plus radar bonus of £100 per annum.

Forms of application may be obtained from
THE AIRPORT COMMANDANT,
LEEDS AND BRADFORD AIRPORT,
YEADON, NEAR LEEDS,
to whom they should be returned not later than May 15, 1961.
HENRY PATTEN,
TOWN CLERK AND CLERK TO THE LEEDS AND BRADFORD AIRPORT JOINT COMMITTEE. 585-5

SENIOR Traffic Officer able to work on own initiative and take charge of handling unit at Gatwick Airport. Write in confidence to Managing Director, Pegasus Airlines, 236 Old Bedford Rd., Luton, Beds. 585-9

VIKING captains and first officers required for Blackpool base. Apply, Chief Pilot, Pegasus Airlines, Squires Gate Airport, Blackpool. 585-10

MINISTRY OF AVIATION
**AIR TRAFFIC CONTROL OFFICERS**

Posts for men or women at least 23 and under 35 on 1st July, 1961. Candidates must have had recent aircrew experience, preferably as pilot or navigator in civil air transport or H.M. Forces; but exceptionally, extensive experience in A.T.C.O. duties may be accepted. They should normally also have G.C.E. with five passes, or an equivalent academic qualification. Starting salary (London) from £872 to £1,251. Maximum £1,599. Appointment initially unestablished, but prospects of establishment and promotion.

*Apply:*
**MINISTRY OF AVIATION**
EST 5(a) 1/R758, THE ADELPHI
JOHN ADAM STREET, LONDON, W.C.2

The lowest priced Copter in the World. Bensen B-7 Gyro-Glider and B-7Mc powered Gyro-Copter. In production by arrangement with Bensen of U.S.A.

*For full details send P.O. 5/-*
**CAMPBELL**
**Laundry Lane, Hungerford, Berks.**

The 175
**Cessna**
**APPOINTED DEALERS**

**Midlands:** Sir Robert McAlpine and Sons Ltd. Luton Airport, Luton, Beds
**East Anglia:** W. H. & J. Rogers (Engineers) Ltd. Gt. Barford, Bedford
**North:** Westair Limited Squires Gate Airport, Blackpool, Lancs
**Scotland:** Airwork Services Limited Perth Aerodrome, Perth, Scotland

SOLE DISTRIBUTORS IN GREAT BRITAIN ARE
**AIRWORK SERVICES**
PANSHANGER AERODROME · HERTFORD
TELEPHONE ESSENDON 315

**Situations Vacant—contd.**

FILM AVIATION SERVICES require staff for film production work in the Middle East and Europe:

1. Experienced helicopter pilot—preference given to pilot with licence endorsed for Bell helicopters and with fixed-wing experience.
2. Experienced light aircraft pilots—preferably with aircraft engineering experience.
3. Licensed helicopter engineer with experience on Bell helicopters.
4. Radio engineer with, if possible, Private Pilot's Licence. Capable of installing and maintaining V.H.F. and H.F. ground/air stations.
5. Pilots experienced on Spitfire, Mustang and Military Gliders Horsa or Hadrian.

WRITTEN applications only to: Film Aviation Services, Ltd., Stone Court, Smallfield Rd., Horley, Surrey. 586-575

THE Wiltshire School of Flying, Thruxton Aerodrome, Thruxton, Andover, Hants, require a Chief Engineer holding A, B and C licences, accommodation available. 586-577

---

A VACANCY HAS ARISEN FOR AN

INTERMEDIATE STRESS ENGINEER

WITH 5-YEAR AIRCRAFT STRESSING EXPERIENCE FOR INTERESTING WORK ON

NEW CIVIL AIRCRAFT PROJECTS.

The successful applicant will enjoy the privilege of air travel at greatly reduced fares on many Continental and other foreign routes.

The airport is conveniently situated on the outskirts of Southend, one hours' travelling time from London by a very frequent electric train service.

Apply in writing to
CHIEF DESIGNER,
AVIATION TRADERS (ENG.), LTD.,
MUNICIPAL AIRPORT,
SOUTHEND-ON-SEA, ESSEX.
or
Phone Rochford 56491
for an appointment. 587-565

---

LICENSED Aircraft Engineer required by the Wolverhambpton Aero Club at Wolverhampton Airport, must hold A and C on current light types, be conversant with everyday maintenance and C. of A. overhaul work, also required, a capable fitter/rigger, accustomed to the above class of work, whose intention it is to obtain licences at a later date. This is a permanent senior post with an expanding organization, offering good prospects and help with living accommodation if necessary. Apply in first instance to: The Manager, Wolverhampton Aero Club, Wolverhampton. 585-3

## SITUATIONS WANTED

GROUP OF

CANADIAN FLIGHT ENGINEERS

SEEKING EMPLOYMENT.

3-5,000 HOURS EXPERIENCE ON L1049G-TYPE AIRCRAFT.

Several have held Aircraft Maintenance Engineer licences. Several hold Commercial Pilot licences and Instrument Ratings, some of whom will later be qualified as First Officers on Viscount aircraft.

PLEASE REPLY TO:

BOX 6,
LACHINE SUB 6,
P.Q., CANADA. 585-573

## TUITION

AVIGATION, LTD., provides full time or postal tuition or a combination of these methods for M.C.A. Pilot-Navigator licences. Classroom instruction can be provided for A.R.B. General, certain specific types and performance schedule examinations, D4 links. Phone, Rodney 8671. For details apply Avigation, Ltd., 30 Central Chambers, Ealing Broadway, London, W.5. Ealing 8949. zzz-771

DENHAM Link Training Centre, cost per hour £1 or 18s. for block bookings. Phone, Denham 2161 or 3171. zzz-789

EXETER AIR CENTRE offers the least expensive and most comprehensive flying training available today, contract rates from £3 7s. 6d. per hour. Normal Auster-Tiger rate £3 12s. 6d.; Chipmunk £5 5s. P.P.L. courses from £108 15s., C.P.L. from £665. Instructor's course from £72 10s. Special attention to individual requirements. Full Air Traffic Control. Radio aids. VHF-DF and 24-hour Met. service, grass or runways. Local accommodation from £3 10s. Airport £5 15s. 6d. Exeter Airport, Ltd., Exeter 67433. zzz-778

LEARN to fly. £32; instructor's licence and instrument flying for £4 per hour; night flying £5 per hour. Residence 6 gns. weekly. Specialized course for commercial pilot's licence. Wiltshire School of Flying, Ltd., Thruxton Aerodrome (Andover Junction 1 hr. 15 min. from Waterloo), Hants. zzz-788

LONDON SCHOOL OF AIR NAVIGATION offers full-time personal coaching with home-study correspondence courses or combination of both for all aspects of professional pilot and navigator qualifications also P.P.L. Officially appointed Services Courses Scheme. 33 Ovington Square, Knightsbridge, London, S.W.3. Ken 8221. zzz-792

SURREY AND KENT FLYING CLUB, Biggin Hill (BN9) 2255. M.o.A.-approved course. Tiger and Hornet Moths. Chipmunk and Prentice. Contract rates. Route 705, one hour from Victoria. 585-0761

TWIN-ENGINE and instrument flying on Airspeed Oxfords, fully equipped with VHF, ADF and ILF, £16 per hour for dual or solo flying. Christchurch Aero Club, The Aerodrome, Christchurch. Phone 1689. 590-579

---

ELLIOTT

# ADVANCES IN AVIATION

**The Guided Flight Group of Elliott Brothers requires ENGINEERS, AERODYNAMICISTS, MATHEMATICIANS and PHYSICISTS at their Rochester and Borehamwood establishments for their expanding research, development and production programme of advanced aircraft control systems.**

Projects now under active development for subsonic and supersonic military and civil aircraft include:—

**AUTOMATIC LANDING INERTIAL NAVIGATION**

**INTEGRATED FLIGHT CONTROL SYSTEMS**

**AIRBORNE DIGITAL COMPUTERS ADVANCED FLIGHT AND ENGINE INSTRUMENTS**

Engineers of all disciplines are invited to apply for these posts which include positions up to Project Management level.

Previous experience in the aviation or electronics field is desirable but the capability of creative thought and action in the development of new concepts and techniques is of major importance.

People wishing to work on fully transistorised and miniaturised equipment, electro mechanical and hydraulic servo controls and digital systems are especially required.

**Apply to Personnel Manager (Ref. 345)**
**ELLIOTT BROTHERS (LONDON) LIMITED,**
**Elstree Way, Borehamwood, Herts.**

---

B. S. T. AERONAUTICAL CO. LTD.

A.R.B. APPROVED

*C47 - DC3 Specialists*

Comprehensive stocks of American hardware held for use on American Executive and Personal Aircraft.
Comprehensive stocks of A.G.S. parts held for use on British Executive and Personal Aircraft.
24 hour A.O.G. service operated, cable or telephone your requirements.
All enquiries handled by experts with many years' aviation experience.
Comprehensive stock list sent by return.
Purchasing agents for foreign governments and overseas airlines.

84 ALEXANDRA ROAD
FARNBOROUGH HANTS.
Telephone FARNBOROUGH 2881/2/3

---

BRITISH
**WIRE THREAD INSERTS**

Precision made in Carbon Steel for Aluminium and Magnesium. Also in Stainless Steel and Bronze.

B.S.F. • Metric • B.S.P. • B.A.
Whitworth • Unified

CROSS MANUFACTURING CO. (1938) LTD.
COMBE DOWN BATH SOMERSET

---

**ENGLISH ELECTRIC AVIATION LIMITED**
**AIRCRAFT DIVISION**
**AIRCRAFT SERVICE DEPARTMENT**
requires

**AIRFRAME INSTRUCTORS**

for Department Training School to instruct Service Personnel and Company employees on aircraft designed and manufactured by the Company. Experience of pneumatic and hydraulic systems in modern aircraft is essential and knowledge of up-to-date R.A.F. methods of instruction would be an advantage.

Application forms can be obtained from:

Personnel Officer,
ENGLISH ELECTRIC AVIATION LIMITED,
Warton Aerodrome, Warton, Nr. Preston, Lancs.
quoting Ref. EE.18/A.

## WANTED

WANTED, propeller for Proctor III, must be less than six years old, with log book. Contact S. F. Jours, care of C.O., Newcastle/Tyne Airport, Woolsington. 585-x3879

A Pair of wings or a starboard wing for a B.A. Klemm Swallow, must be sound, minor repairs immaterial. Mr. W. Rutt, Wilbury Hill Farm, Letchworth, Herts. Phone 68. 586-x3931

## BOOKS AND PUBLICATIONS

"CAMERA IN THE SKY," by Charles Sims, with a preface by Air Chief Marshal Sir James Robb. For more than 30 years Charles Sims, chief photographer of THE AEROPLANE AND ASTRONAUTICS and one of Britain's best-known aerial photographers, has watched the amazing growth of British aviation from a ring-side seat. In this book he recalls with pen and camera, enlivened with anecdotes, some of his many memories of those eventful days. Illustrated, 218 pages, 25s. net from booksellers, or 26s. 6d. by post from the publishers, Temple Press Limited, Bowling Green Lane, London, E.C.1. zzz

"AEROPLANES AND AERO-ENGINES" (4th Edition). A new edition comprising 24 two- and three-page cutaway drawings which includes a variety of British civil and military aircraft and 10 piston engine, jet and gas-turbine power plants. Illustrated. 56 pages. Price 5s. net from booksellers, or 5s. 7d. by post from the publishers, Temple Press Limited, Bowling Green Lane, London, E.C.1. zzz

"THE AEROPLANE" PICTORIAL REVIEW (No. 5). Staff of THE AEROPLANE AND ASTRONAUTICS. This fifth annual collection of outstanding aviation pictures contains over 200 photographs grouped in 12 sections and descriptively captioned. Illustrated, 128 pages, 12s. 6d. net from booksellers, or 13s. 7d. by post from the publishers, Temple Press Limited, Bowling Green Lane, London, E.C.1. Other volumes available in this Series: THE AEROPLANE Pictorial Review, No. 3, 10s. 6d. net (post free 11s. 7d.). THE AEROPLANE Pictorial Review, No. 4, 12s. 6d. net (post free 13s. 7d.). All other volumes in this Series are now out of print. zzz

THE "POWER AND SPEED" SERIES FOR BOYS. "Aircraft and Air Power," by F. G. Swanborough, of THE AEROPLANE AND ASTRONAUTICS, has been written for intelligent boys between the ages of 10 and 16. The author surveys modern military flying and includes chapters on combat aircraft, scientific aids and missiles. Other titles in this Series are "Motor cars," "Locomotives" and "Ships and Shipbuilding." Illustrated, 112 pages, 10s. 6d. net from booksellers, or 11s. 5d. by post from the publishers, Temple Press Limited, Bowling Green Lane, London, E.C.1. zzz

PRINCIPLES OF HELICOPTER ENGINEERING, by Jacob Shapiro. This comprehensive review of the engineering principles governing the design and construction of helicopters provides a complete survey of recent knowledge in the field. Illustrated, 448 pages, 55s. net from booksellers, or 56s. 9d. by post from the publishers, Temple Press Limited, Bowling Green Lane, London, E.C.1. zzz

INTERPLANETARY FLIGHT. An introduction to Astronautics (2nd edition), by A. C. Clarke. Completely revised in the light of recent advances in the science of astronautics. Includes a chapter on earth satellites and lunar probes and an appendix of fundamental theory and mathematical data. Illustrated. 152 pages, 12s. 6d. net from booksellers, or 13s. 4d. by post from the publishers, Temple Press Limited, Bowling Green Lane, London, E.C.1. zzz

THE EXPLORATION OF SPACE (First Cheap Edition), by A. C. Clarke. Provides answers to the many questions the intelligent layman asks about the science of astronautics. Over 375,000 copies sold in all editions. Illustrated. 212 pages. 8s. 6d. net from booksellers, or 9s. 5d. by post from the publishers, Temple Press Limited, Bowling Green Lane, London, E.C.1. zzz

MODERN AIRCRAFT DESIGN, by J. L. Naylor. Provides technicians in allied industries with an account of the wide background of knowledge behind the design of modern aircraft. Illustrated. 128 pages. 9s. 6d. net from booksellers, or 10s. 2d. by post from the publishers, Temple Press Limited, Bowling Green Lane, London, E.C.1. zzz

"THE AEROPLANE" DIRECTORY OF BRITISH AVIATION, 1960. An annual guide to aviation throughout the British Commonwealth including Air Forces, Ministries, Organizations, Airlines, Industries, Flying Clubs and Aerodromes, together with a Biographical Section containing over 1,600 entries. 567 pages, 30s. net from booksellers, or 31s. 9d. by post from the publishers, Temple Press Limited, Bowling Green Lane, London, E.C.1. zzz


WHITTEMORE'S

The country's finest aeronautical, radio, sales servicing and installation centre.

The best costs no more at

WHITTEMORE'S

Biggin Hill 2211. Kent.

I FLY PIPER

*Sole Distributors in the U.K.*

VIGORS AVIATION LTD. OXFORD AIRPORT. KIDLINGTON 3444

**Southend Municipal Flying School**

offers comprehensive training (day and night) for commercial and private pilots in the environment of an international airport. No entrance fees. Airport Club available to members.

**Austers £4.5s. solo ; £4.15s. dual ; contract rate £4. Chipmunk £5.10s. dual or solo.**

**Municipal Airport, Southend-on-Sea, Essex**

Phone : Rochford 56204.

WHITTEMORE'S

have vacancies for

"A" or "B"

RADIO or AIRFRAME ENGINEERS

5 day week. Excellent pay and conditions.

*Phone, write or call.*

BIGGIN HILL 2211 (PBX)

KENT.

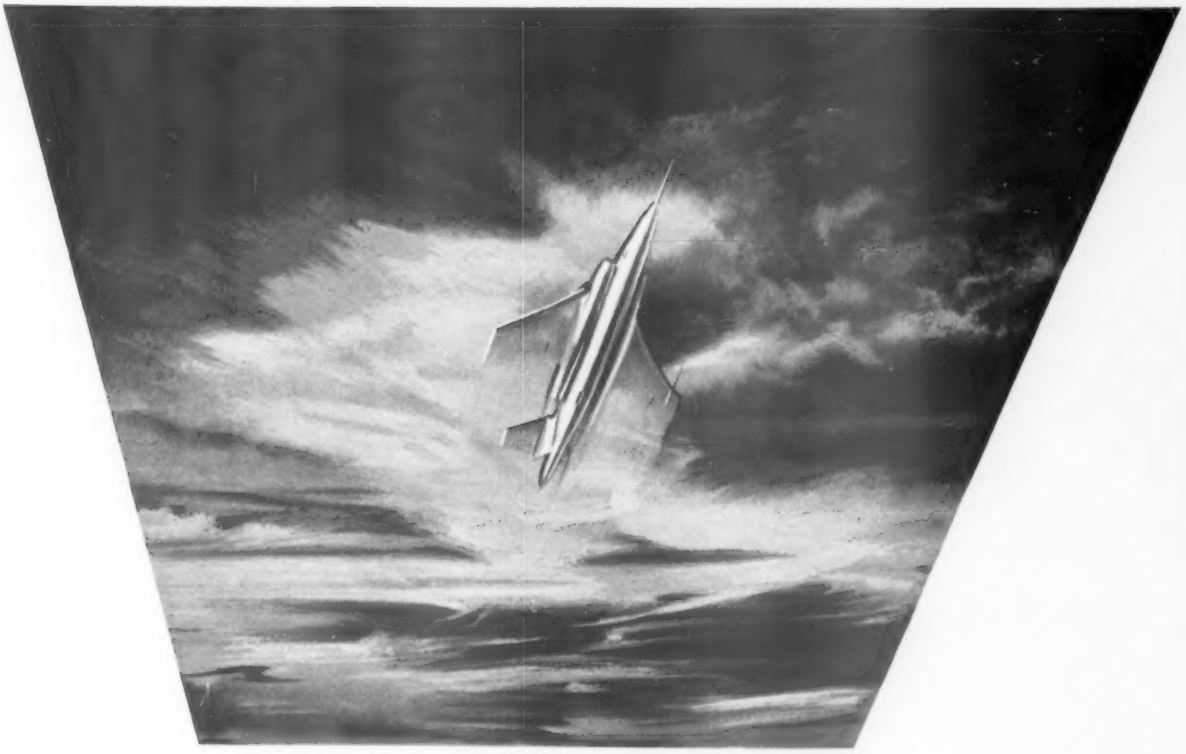

# INDEX TO ADVERTISERS


| Name | Page |
|---|---|
| **A** | |
| Aero American Corporation | 30 |
| Aero-Enterprises (Boreham Wood), Ltd. | 25 |
| Air Bent, Ltd. | 12 |
| Airwork Services, Ltd. | 24, 32 |
| Associated Electrical Industries, Ltd. | 23 |
| **B** | |
| Boulton Paul Aircraft, Ltd. | Inside Back Cover |
| British Airline Pilots Association | 32 |
| British Aviation Insurance Co., Ltd., The | 10 |
| British Executive and General Aviation, Ltd. | Front Cover |
| British Oxygen Aviation Services | Inside Front Cover |
| B.S.T. Aeronautical, Ltd. | 33 |
| Burndept, Ltd. | 11 |
| **C** | |
| Campbell, D. | 32 |
| Clifford, Peter, & Co., Ltd. | 8 |
| Crook, Anthony, Motors, Ltd. | 31 |
| Cross Manufacturing Co. (1938), Ltd. | 32, 33 |
| Cunard Eagle Airways, Ltd. | 32 |
| C.W.C. Equipment Ltd. | 6 |
| **D** | |
| Decca Navigator, Ltd. | 22 |
| Dundas, R. K., Ltd. | 31 |
| **E** | |
| Elliott Brothers (London), Ltd. | 6, 33 |
| English Electric Aviation, Ltd. | 33 |
| **F** | |
| Flair-Aviation, Ltd. | 7 |
| **H** | |
| Hants & Sussex Aviation Ltd. | 13 |
| Hawker Siddeley Aviation, Ltd. | 16, 19 |
| Hymatic Engineering Co., Ltd. | 2 |
| **K** | |
| Keegan Aviation, Ltd. | 27 |
| **L** | |
| Lancashire Aircraft Co., Ltd. | 12 |
| Lockheed Precision Products, Ltd. | Back Cover |
| London Aero Club | 13 |
| **M** | |
| Marshalls Flying School, Ltd. | 32 |
| McAlpine Aviation, Ltd. | 9 |
| Ministry of Aviation | 32 |
| **N** | |
| Newton Bros. (Derby), Ltd. | 6 |
| Norco Engineering, Ltd. | 13 |
| **O** | |
| Oxford Aviation Co., Ltd. | 3 |
| **R** | |
| Rent-a-Plane, Ltd. | 10 |
| Rollason Aircraft & Engines, Ltd. | 10 |
| Rolls-Royce, Ltd. | 21 |
| Rumbold, L. A., & Co., Ltd. | 13 |
| **S** | |
| Sangamo Weston, Ltd | 24 |
| Shackleton, W. S. (Aviation), Ltd. | 30 |
| Shell Aviation Services | 17 |
| Short Brothers & Harland, Ltd. | 5, 30 |
| Simmonds Aerocessories, Ltd. | 4 |
| Smiths Aviation Division | 14, 15 |
| Southend Municipal Flying School | 34 |
| **T** | |
| Teddington Aircraft Controls, Ltd. | 8 |
| Titanine, Ltd. | 28 |
| Triplex Safety Glass Co., Ltd. | 29 |
| **U** | |
| United Dominions Trust (Commercial), Ltd. | 20, 26 |
| **V** | |
| Vigors Aviation, Ltd. | 1, 34 |
| **W** | |
| Walter, A. J., Ltd. | 12 |
| Westland Aircraft, Ltd. | 18 |
| Whittemore, A. J., & Sons | 34 |



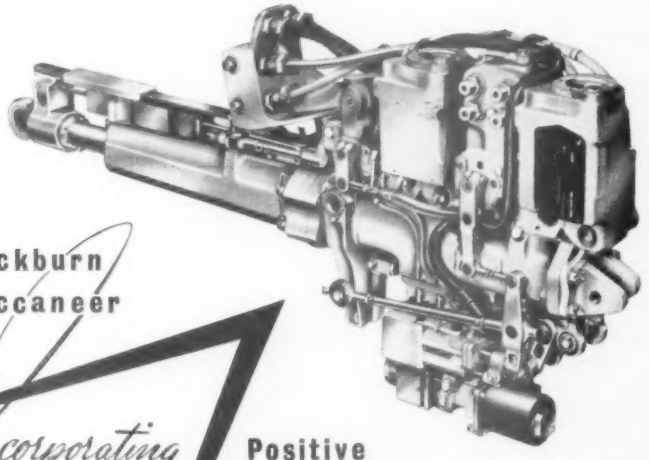
Printed in England and Published Weekly by the Proprietors, TEMPLE PRESS LIMITED, BOWLING GREEN LANE, LONDON, E.C.1.

Registered at the G.P.O. as a Newspaper. Second class postage paid at New York, N.Y. Registered for transmission to Canada and Newfoundland by magazine post. Annual Subscription Rate United Kingdom 96/-, other countries 100/- (Canada and U.S.A. $15) postage included. Shorter periods pro rata. AGENTS ABROAD—EUROPE—Messageries Dawson (S.A.), Paris; Messageries, Hachette et Cie., Paris; W. H. Smith & Son, Paris and Brussels. CANADA—Wm. Dawson Subscription Service, Ltd., Toronto; Gordon & Gotch, Ltd., Toronto. U.S.A.—Eastern News Co., 306 West 11th Street, New York, 14, N.Y. AFRICA—Central News Agency, Ltd., Cape Town; Wm. Dawson & Sons (S.A.), Cape Town. ASIA—W. Thacker & Co., Ltd., P.O. 190, Bombay. AUSTRALIA and NEW ZEALAND—Gordon & Gotch (A'sia), Ltd.



**RELIABILITY BREEDS CONFIDENCE**

The pilot's control of his aircraft is at all times positive and precise, instilling in him that confidence in manoeuvre so vital to successful accomplishment.



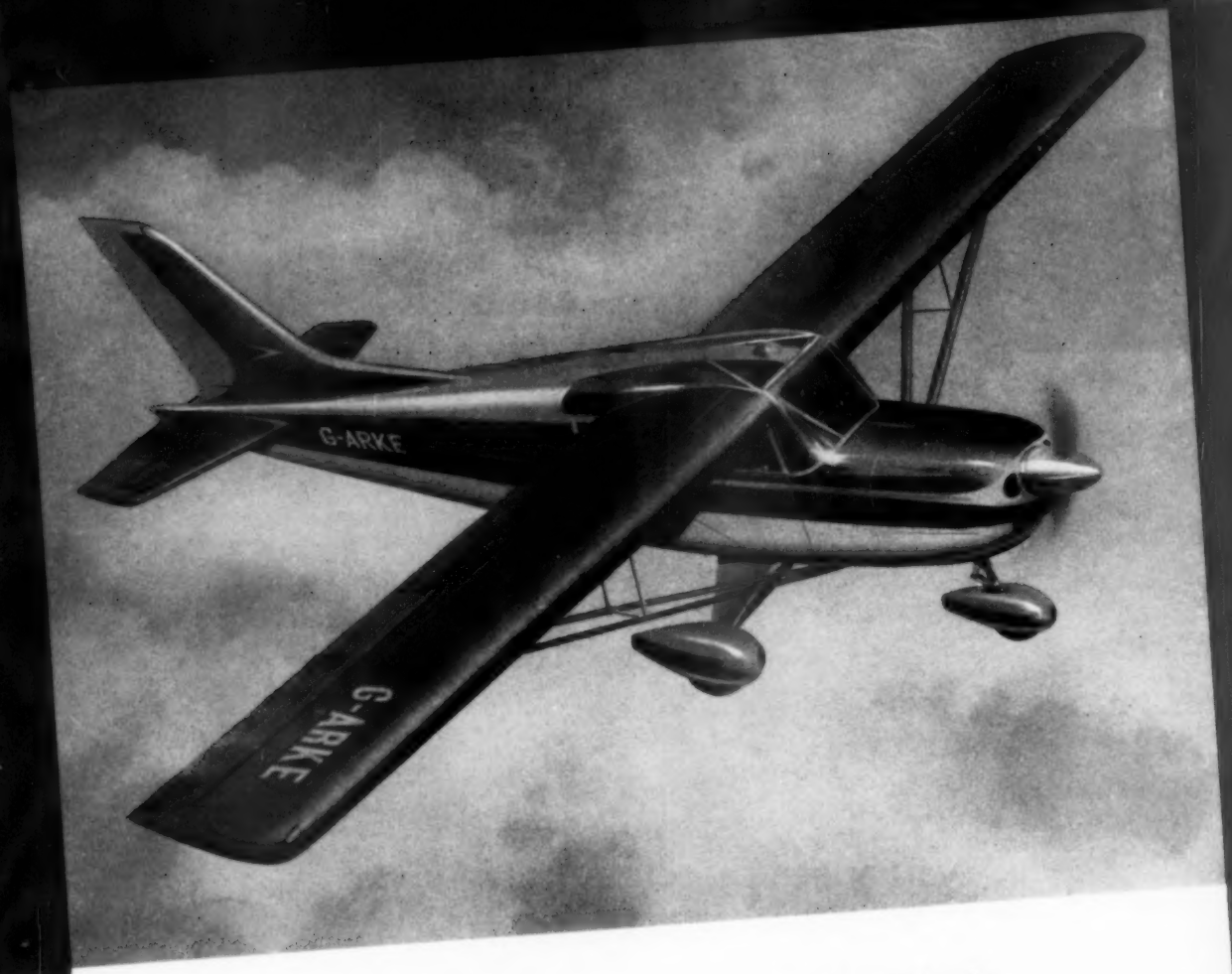
Blackburn
Buccaneer

*Incorporating*

Positive
Precise
Power Controls

**BOULTON PAUL AIRCRAFT LTD**

WOLVERHAMPTON – ENGLAND




# The Beagle Auster Airedale

is Europe's latest executive aircraft—the first produced by the "Beagle Group". It is a four-seater, high-wing aircraft offering an economical performance, with a tricycle undercarriage for ease of operation: the steering oleo leg is by Lockheed.

Lockheed

ONE OF THE AUTOMOTIVE PRODUCTS GROUP